PMI

PHOTO METHODS FOR INDUSTRY

VOL. 1 NO. 12
DECEMBER
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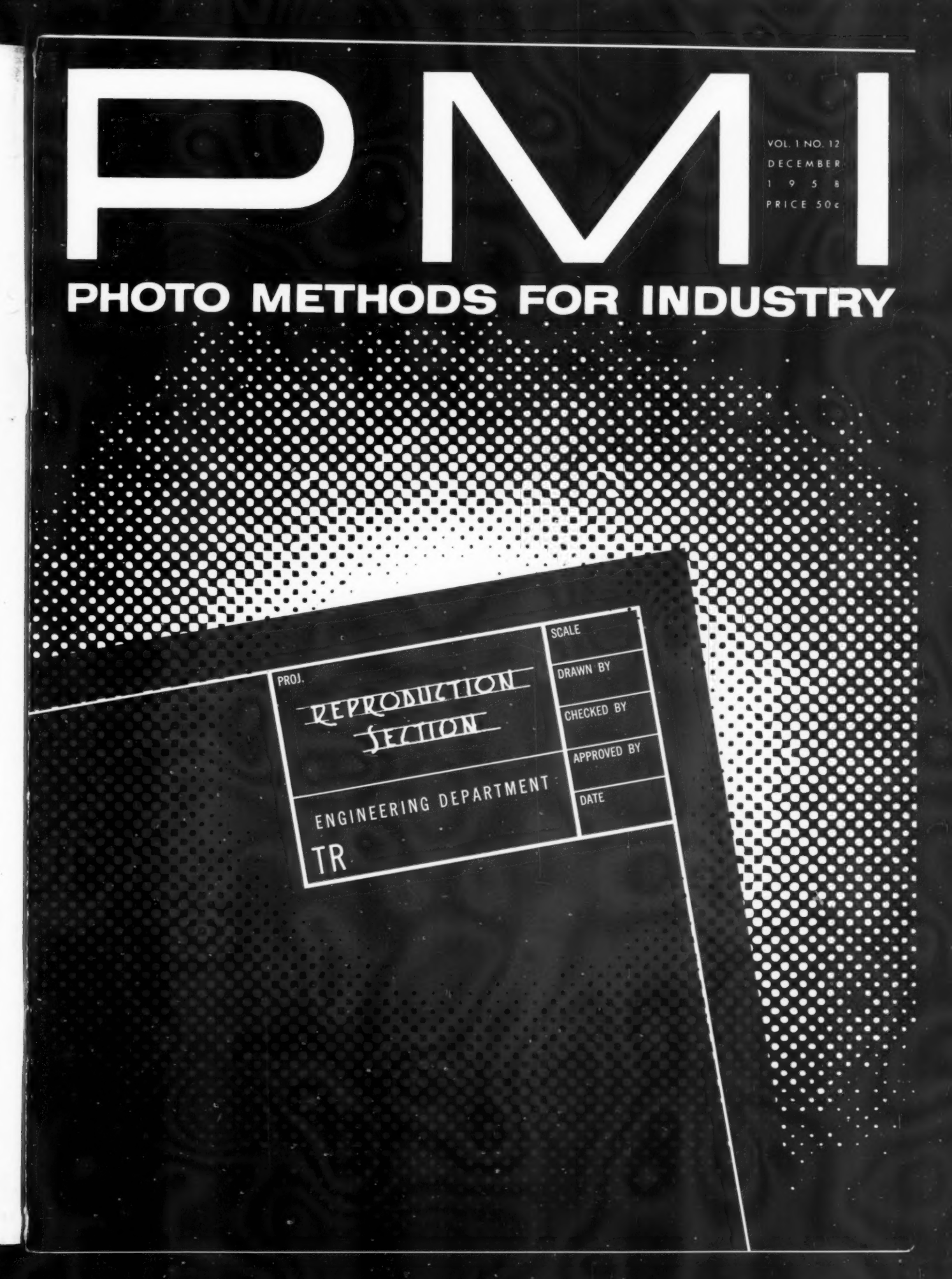
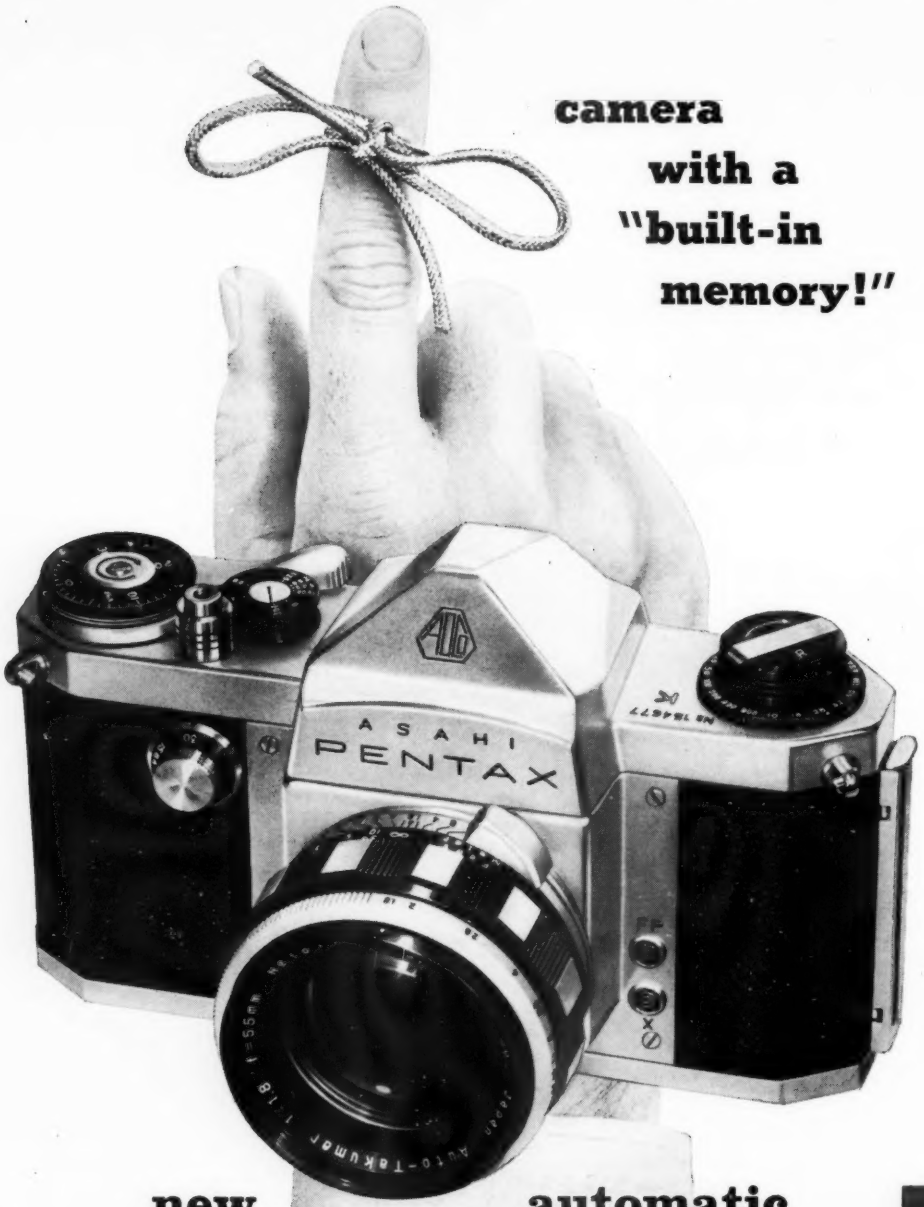
PRICE 50c





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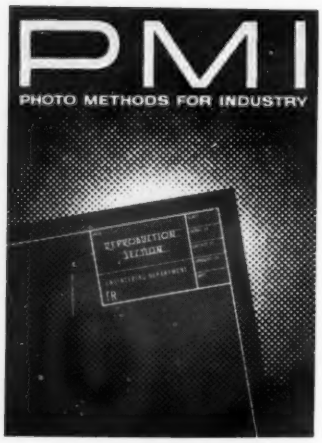

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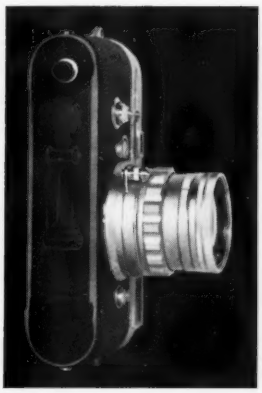

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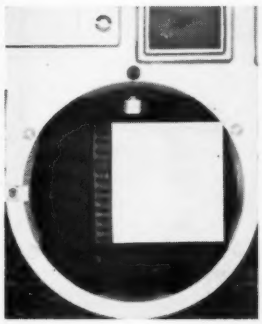

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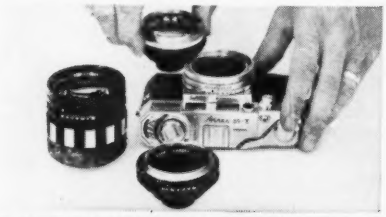

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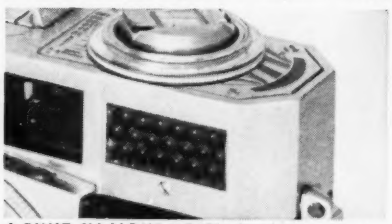

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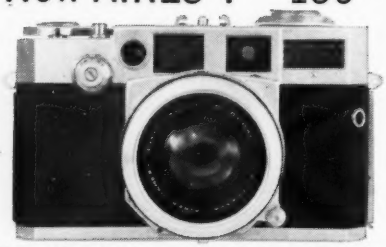

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Get more information. Circle 403, page 59

F.Y.I.

The fuzzy-haired gentlemen in the photograph on this page, who look as though they'd like to do something about the Viewlex Viewtalk portable battery-operated AV arsenal but can't figure out what, are in the interior of Africa. Missionaries find the portability of the unit, which combines a projector with a 3-speed record player and amplifier, a great help in inflicting civilization on trusting natives. The news saddens us, for

we've always cherished the dream of escaping from the terrifying efficiency of AV—in the interior of Africa. Civilization has beaten us there. If you can't lick 'em, join 'em. I wonder whether Miltown has a distributor in Mombasa.

Lenses and lenses

Not all the trickly light-bending takes place in front of photo film. To wit, this item from Armour Research Foundation's *Industrial Research Newsletter:* "New vision for the partially blind is result of developing a tri-optic spectacle lens with magnification range of 300 per cent to 500 per cent, reports Dr. William Feinbloom, Optometric Center, New York. Each single lens, incorporating Fresnel principle in three separate viewing sectors, is fitted to standard frame. Overall lens is transparent plastic. Upper, embedded sector is multiple lens system of eight optical surfaces focusing at infinity and producing 300 per cent magnification. Center sector has two plastic curved surfaces of varied thickness for freely moving, 120-degree visual field. Lower sector, embedded in the overall lens, is compound lens system with an air space and four to six lens surfaces producing as much as 2,000 per cent magnification for reading."

Hot soup coming up

The day of the leisurely photographic image is rapidly coming to a close; the time isn't far off when any developing time longer than a minute will be used only by fuss-budgets and super-technicians.

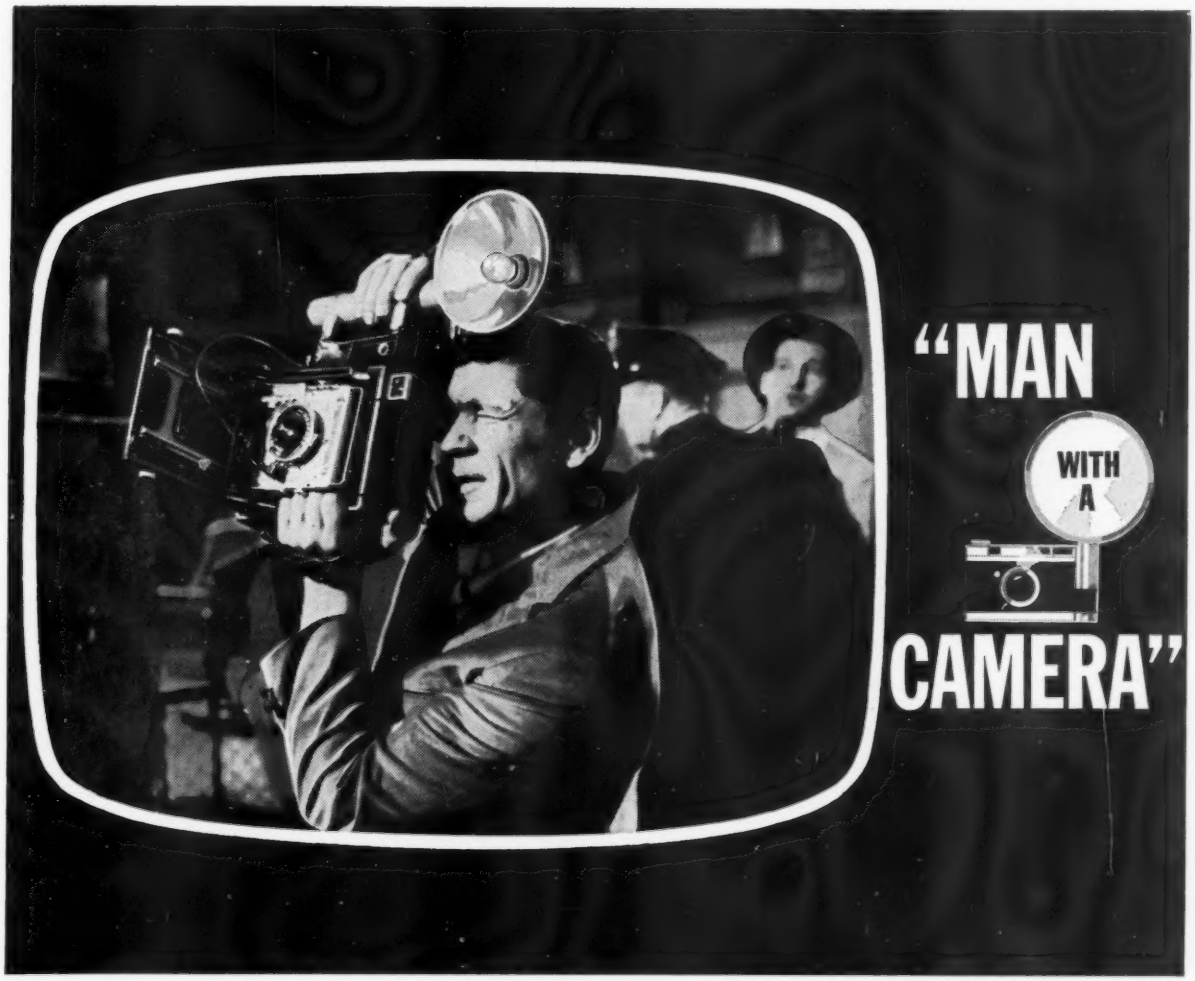
At the recent SPSE clambake in Rochester, J. B. Taylor of Ansco described a new system of airborne rapid processing of radar recording film, and a special film for it.

Called Ansco Hyscan, the film is sensitive to the color of the light emitted by cathode-ray-tube phosphors. Its characteristics allow its complete development within five seconds without stop bath or fix. Hot high-energy developer provides the processing speed. Hyscan film has a thinly-coated, hard emulsion to accelerate developer penetration. The developer is squeegeed off the film as it emerges from the bath. Incidentally, this unusual developer is self-limiting; that is, it can stay on the film longer than the required time and still yield an acceptable negative. The developer also contains organic materials to inhibit fog and stabilize the unfixed silver halide to light. What's left on the film after squeegeeing dries and oxidizes almost immediately. Complete fixation can wait until the plane lands.

We got witnesses

Devern A. Chubb, chief engineer at Abrams Instrument Corp., brought out an interesting point at the SPSE do. He maintained that radar picture records containing time of sighting and radar range would be incontrovertible evidence about the cause of an aircraft or steamer accident, such as the one involving the *Andrea Doria.* This is straight stuff from an expert; the Abrams Instrument Corp. makes a radar camera that simultaneously photographs a counter, data card, clock, and range indicator, all on 35mm film.—THE END

MEET A COLLEAGUE– MIKE KOVAC, FREE-LANCE PHOTOGRAPHER



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We think you'll like Mike. We hope you'll watch him on "Man With A Camera." It's your show, and we're proud to be sponsoring it.

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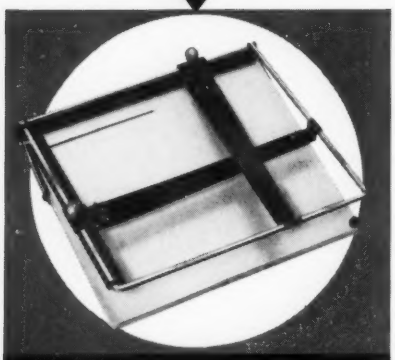

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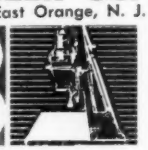

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LETTERS

To the Editor:

. . . On Portfolio No. 7, page 33, in talking about Torkel Korling shooting those template shots, I believe that if you will check you will find that the shot was made with white paper in the bottom of the drawer, a sheet of clear glass over the top of the drawer, and a couple of No. 2 photofloods and reflectors coming in from the upper left hand corner.

If the shot had been made as explained in your editorial comment, there would not have been any shadow effect as seen on the left hand corner, nor would there be any shadow from the hand on the glass as seen in the lower edges and right hand corner of the picture.

I noticed this shot in particular because I just had an opportunity to do something very similar. We had a black translucent glass dish with dark red raised lettering embossed on it which had to be photographed for a magazine illustration. Nothing would do much of a job in bringing out any contrast between the two items without burning highlights into the surface of the black onyx glass. Finally, we solved the problem by placing a glass dish on a piece of mechanical drawing tracing paper and bringing a No. 2 flood lamp to bear on it from the bottom of the paper, shining through illuminating the dish causing the translucent glass to be somewhat lighter than the dark printing and giving us a good black-and-white separation which we needed. Naturally, for a color shot this would not have worked at all unless we had used a double exposure, working for the color on the lettering with a number one exposure from top and off to the side to cut the highlight.

Keep up the good work, PMI is still one of the best things that has happened in the photo industry.

Your nice play on *New York Stages A-V Week* certainly should be appreciated by all of us in the audio-visual industry.

Kenneth W. Webster
Audio Visual Aids Service
Concordia Publishing House
St. Louis, Mo.

Sorry, the picture was made the way we said it was—which goes to prove that truth is stranger than fiction or something. Thanks a lot for your interest though. Alert readers make everything worth while. Ed.

To the Editor:

I want you to know, and I'd like the writer to know, how much my photographic friends and I enjoyed Rickards' *Deadpan Dictionary of Photography* in the August issue of PMI. Don't know how you managed it—with all respect to your good magazine, the dictionary deserves to be seen in a publication with much wider circulation than industrial-photography-restricted PMI.

My congratulations also to you on the more serious matter currently appearing in the magazine.

Will Thompson
Plymouth Oil Co.
Sinton, Texas

To the Editor:

. . . I enjoyed your editorial in the May issue very much, because I am one of the photographers who had my own studio and gave it up in favor of working for someone else and do without the headaches of my own place. I kept my 4 x 5 Linhof outfit and Leica outfit. Now I can do the assignments that I want to and charge the prices that I think the job is worth and still have an income if they don't want to pay the price for the job. Every now and then I think about working for myself again, but all I have to do is to think back to my freelance days and I'm glad that I am here instead of there. Your editorial expresses it better and plainer than I ever could. I am happy to know that other people have similar problems.

I enjoy your magazine very much and get a great deal of information from it.

Wendell D. Gillett
Medical Illustration Service
V. A. Hospital
Louisville, Ky.

To the Editor:

. . . I feel that a year's subscription to PMI is a must at this time. It took a while to get used to a "stimulating publication" and once having let it "take hold" I wouldn't be without it. It truly is a professional photographer's dream! . . . The consistent quality features and contributions by fellow professionals set this magazine apart and above any publication it has been my pleasure to subscribe to. Don't give a hoot what anyone thinks about MY endorsement, but for my money PMI is a must for any photographer.

Good luck in the future.

Arthur Kunkel
Kunkel Aerial Surveys
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by Edward R. Farber

ELECTRONIC FLASH

Photokina: New speedlights, new power sources, smaller size.

Searching through the 1500 booths at the vast biennial Photokina, in Cologne, Germany, we found a dozen or so electronic flash units being demonstrated. Some names are familiar here; others were new: Multiblitz, Mecablitz, Ultrablitz, Hotronic, Ukatron, Pic, Paxitron, Witrona, Sunnax, Masterflash, Elmed, Braun Hobby and Broncolor.

As in the U.S., "transistor" is the magic word. Eight of the 13 units had transistorized control circuits designed to turn off the capacitor charging circuit when a predetermined voltage is reached. If capacitor leakage, or current flowing through other circuit elements, causes the voltage to drop the charging circuit is reactivated and the unit operates until the predetermined voltage is reached again.

Such circuits make the use of "flashlight" cells most practical since very little current is consumed during idling periods between flashes, and output can be kept constant even though battery voltage falls.

Storage batteries also can provide many more hours of use and smaller cells are practical, thus reducing size and weight. Both Reeves and Revere have produced such units in the U.S., and more are sure to come if we follow the German trend.

Some of the smaller units shown used transistor charging circuits that eliminated the use of the vibrator. Other manufacturers claimed they could provide more rapid recycling and reliable operation at lower cost by using vibrators although they used transistors in the control circuit. Smaller and lighter units were much in evidence, yet energy storage remained the same. The new Braun Hobby is 20 per cent lighter and 40 per cent smaller than its predecessor of like watt-second rating. The power pack of the Multiblitz is only 4½ x 6 x 2 in. and contains a rechargeable storage battery. Weight is only a little over two pounds.

All the new units used very small reflectors. Some used compact rectangular reflectors which permitted the use of straight flashtubes. (Since the straight tubes are easier to make, there is considerable saving in original and replacement cost.) These new shapes seem to give satisfactory coverage, although light distribution curves were not available.

Most chargers were built-in, and batteries included the usual nickel cadmium and size D cells.

Two new types made their appearance at the show. There was the "Barix" battery, said to be a barium-cadmium battery which is less costly and claimed to have a life of some four years under severe use. (A nickel cadmium battery should last almost indefinitely.) And there was a low-cost, lightweight, lead acid battery which is designed for limited use and then replacement. One manufacturer indicated 50 to 60 flashes per charge and a life of 1500 flashes from such a battery. This is, of course, some 30 recharges.

The clever use of plastics was in evidence everywhere. Mecablitz had an all-plastic battery compartment for its size D cells, even to the latch and hinges thus insuring freedom from corrosion. Braun Hobby had an ingenious switch which would not turn on the battery while the AC plug was inserted. When the plug was removed and the switch turned on, a plastic slide covered the AC input to prevent shock.

Most prices ranged from $30-$40 and most German amateurs and professionals regard this as a good investment. When the Photokina opened, some 20 news and magazine photographers were on hand at the formalities to photograph dignitaries and the president of the state. Not one used a flashbulb. This prompted further observation during my travels in Germany, the Brussels Fair and in Paris. It was electronic flash almost exclusively. Note though that these people are shooting a great deal of black-and-white with

(Continued on page 19)

Lockheed's latest commercial airliner, the "Prop-Jet Electra."

Lockheed chooses Super Anscochrome 16mm for all tough shooting problems

Everett C. Kelley,
Supervisor
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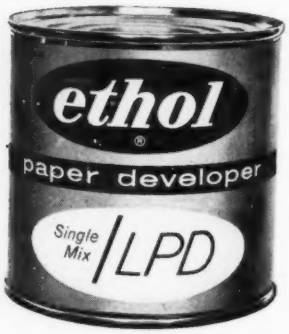

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by LLOYD E. VARDEN

PHOTO METHODS FOR TOMORROW

What happened of technical importance during 1958?

Daily news is presented by one television commentator with the prologue, "News was made this day by . . ." This tends to make the usual trivial items discussed more exciting and dramatic for viewers, but when the program is over there is seldom much to chew on.

During 1958 progress *was* made in photography, but nothing occurred of sufficient importance to warrant the exuberance of the well-meaning news reporter.

When requested to prepare this review I was cautioned to be very selective. The PMI editors apparently gained the impression from the mass of news releases they receive that great things had taken place in 1958 in photographic theory and practice. I agreed that selectivity would be necessary because I was—at the moment—convinced that far too many developments had been reported in the literature than could be dealt with in a brief column. It was a tremendous revelation to learn how wrong one can be about current progress. I went through approximately 2000 periodicals in search of items that one can easily overlook in the normal course of scanning the literature. My conclusions: First, I overrated the situation. Second, I lost track of time and found that 1958 innovations—in my unthinking mind —were actually described in 1957 or even 1955.

Well, I have still been selective in presenting the items to follow.

New high-speed films and new products have generally been disregarded because they are described in other sections of PMI and because the techniques for their use do not differ markedly from customary practice.

10,000 times faster

The Air Force announced that its new device, appropriately called the "Cat Eye," for obtaining pictures of planets and stars in *daylight* has a sensitivity of about 10,000 times that of the fastest photographic films. The device was conceived by Mr. Radames K. H. Gebel of the Aeronautical Research Laboratory of the Wright Air Development Center, and utilizes a television system that incorporates an optical amplifier. It is coupled with a 10-in. refracting telescope for daylight stellar recording. The electronically-formed image is exposed on film for obtaining permanent photographs. Exposures are made at 1/25 sec., or less, and are said to be equal to, and often better than, photographs made by conventional telescopic procedures. (*Journal of the Franklin Institute,* October, 1958).

New color projection technique

Dr. W. E. Glenn of the General Electric Research Laboratory, Schenectady, N. Y., described and demonstrated a new optical system for projecting images in color at the March, 1958, meeting of the Optical Society of America. A diffraction grating is employed to separate colors in an image. As early as 1899, R. W. Wood suggested a similar method but could

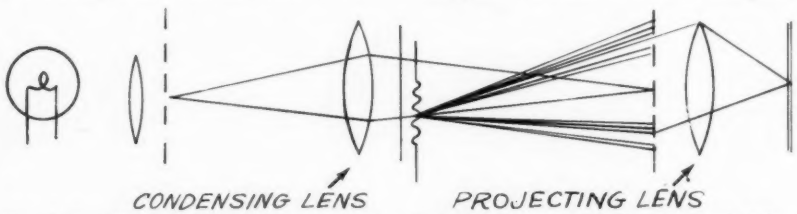

Fig. 1. Dr. Glenn's optical system for color projection from specially prepared slides.

not make it practical. Fig. 1 shows Dr. Glenn's optical system for color projection from specially prepared slides.

The light from line sources is imaged by a condensing lens on a set of bars in front of the projection lens, thus preventing the light from being transmitted. Ripples on the surface of the film placed in front of the condensing lens will diffract light between the bars. The projection lens then images a light spot on the screen in a position corresponding to that of the ripples. If the light sources and the slots between the bars are made small enough, the system can be made to pass light of a particular color. For a given source and bar system the color transmitted depends upon the grating spacing of the ripples on the film, and the intensity of the color depends upon their amplitude. Gratings can be made on black-and-white film. A mask can be prepared to fit into a camera so that color information is transferred directly into these gratings. Therefore, slides that appear to be black-and-white can produce a full color image when projected onto a screen by Dr. Glenn's system. (*Journal of the Optical Society of America*, November, 1958).

New contrast control method

Mr. Alfred J. Watson of Watson Electronics and Engineering Co. Inc., described a so-called "fluorododge" method for contrast control in photographic printing. In principle the method relies upon the quenching of fluorescence by infrared radiation. A fluorescent coating, for example, can be exposed to ultraviolet radiation, then exposed to infra-red through a black-and-white negative to form a fluorescent positive image used as a printing light source. It then acts in effect as a mask in compressing the density range of a high-contrast negative. (*Photogrammetric Engineering*, September, 1958).

Polymerization processes

The work of Dr. Gerald Oster and his associates at the Brooklyn Polytechnic Institute on new photochemical reactions that have certain photorecording implications gained attention in the press and scientific literature (PMI, May, 1958, pp. 12-14). Oster described his photographic intensification procedure in March, 1958, before the N. Y. Section of the American Chemical Society, although preliminary notes on the process had been published earlier. By "intensification" is meant a means by which normal development of a silver halide

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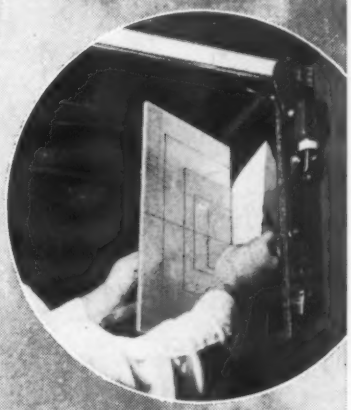

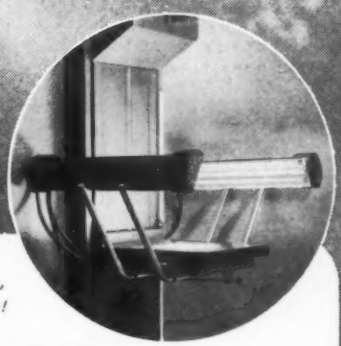

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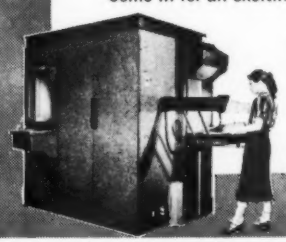

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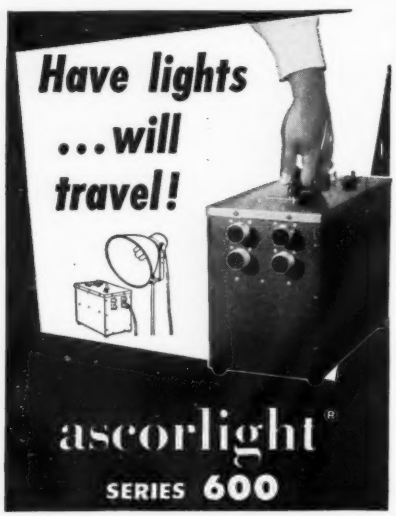

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layer is assisted in amplifying the density obtainable from a given exposure. Dr. Oster found that certain monomers, e.g., calcium acrylate monomer, could be made to polymerize if contained in an exposed photographic emulsion that is developed in an aminophenol developer at a pH of around 8.0. The polymerization depends upon the amount of silver developed; therefore, it is an image-forming reaction. The polymer formed increases the effective density by back reflection of light.

In another system, described by Broyde, Joussot-Dubien and Oster of Brooklyn Polytech, certain dyes contained in glucose of high viscosity form the recording system. The dye known as *Azure A* (bluish) is reduced to a colorless compound when exposed to red light in the presence of the glucose. But given another exposure to light of shorter wavelength color is restored. Ultraviolet exposure causes red to form, X rays cause blue to form.

Slide-O-Film

The Charles Beseler Company of East Orange, N. J. introduced a heat developable film for making black-and-white slides from 35mm or 2¼ x 2¼ negatives. The film is merely placed in contact with a negative between slide glass, exposed in a projector and then heated briefly to form the positive image. The image-forming system is based on the release of nitrogen gas when a diazo compound is light exposed, followed by gas bubble formation within the layer during heat development. The finely distributed bubbles scatter specular light, giving the same effect as though the light were absorbed.

New photorecording systems

The National Cash Register Company, Dayton, Ohio, extended their technique for producing NCR (No Carbon Required) business forms so that it can form the basis for a dry photocopying process. In making their NCR material, a special oily liquid is dispersed into microscopic-sized droplets and then coated with a thin skin of gelatin. Each capsule thus formed is about one millionth of an inch in diameter, consisting of 70 per cent liquid and 30 per cent gelatin. The capsules are coated with a binder onto a sheet of paper and the coated side is placed in contact with another sheet of paper having a special clay coating. When pressure is applied by a typewriter key or pencil, for example, the capsules are ruptured. The liquid released reacts with the clay coating to form a blue color. For multiple copies a stack of sheets each coated with clay on one side and liquid-containing capsules on the other is used.

The new variation of the process depends upon a recently discovered class of light-sensitive dyes, called metachromic dyes. When in a liquid and exposed to light they change color. Such dyes contained in minute capsules along with a volatile oil will produce a characteristic color upon exposure to light. Pressure applied to the sheet breaks the capsules; the oil evaporates leaving a dye image wherever the sheet has been exposed. (*Chemistry*, March, 1958).

Processing control

For improved sensitometric control of film processing, J. F. Crosfield Ltd., London, devised a density measuring system that operates in the developing tank itself. Called the Gammatron, the instrument measures two densities simultaneously during the course of development, using infra-red radiation to which the film is insensitive. When the density range reaches a preselected value the film is automatically transferred to the stop-bath. The film, of course, must be given two controlled exposures prior to development, chosen so that the densities they produce fall within the density range required for a given reproduction process. These exposures may be made by contact printing through two selected grey scale patches, or during film exposure by placing grey card patches next to the subject. The exposures are made along the edge of the film adjacent to each other. (*Gravure* July, 1958, pp. 24 and 52).

A more elaborate densitometer of this type, but one that draws out complete D Log E curves during development, was introduced by Quantametric Devices, Inc., Binghamton, N. Y. The densitometer scans a sensitometric test strip (exposed previously through a full range of exposures) while development takes place, and an automatic recorder draws the D Log E curve on a sheet of chart paper. This instrument permits an investigator to obtain an entire family of curves for successive development times on the same sheet of chart paper, which is most useful for photographic research and control purposes. (Private communication from M. H. Sweet, Pres., Quantametric Devices, Inc.).

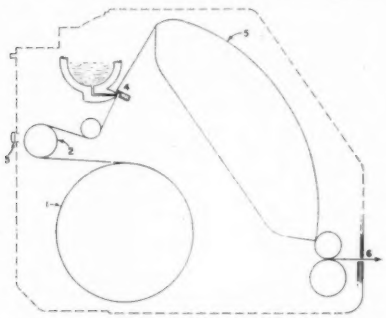
Electroluminescent sources

Area sources of light based on electroluminscence became generally available and are rapidly finding practical applications. These sources

have a conductive base (metal or glass having a conductive coating); a layer of a phosphor, e.g., zinc sulfide; a transparent electrically conductive coating and a protective layer. When an alternating voltage is applied between the conductive base and the protective coating the entire surface of the panel glows. The light output is low, which is desirable for many purposes. A typical panel today, operated on 110/120 volts, 60 cycles, produces only one foot-lambert. They consume only a trace of current and last up to 30,000 hours, but the initial cost is still high. Sample panels for testing cost $1 a square inch from one producer, and $30 for a 12 x 12-in. panel from another producer. Costs go down considerably when ordered in production lots, but even then a panel the size of a clock dial face (4-in. diameter) costs about $1. (*Product Engineering*, September 15, 1958).

Datarite

Consolidated Electrodynamics Corporation, Pasadena, Calif., in their new *Datarite* oscillograph attachment accomplish the development of photographic recording papers at speeds up to 25 in. per second. Almost immediately after exposure a thin film of developer is metered onto the emulsion side of the paper, followed by application of heat to the opposite side. (*See drawing.*) The heat accelerates the action of the developer, before the paper becomes dry. The oscillogram



Consolidated's Datarite oscillograph attachment: a thin film of developer is metered onto the emulsion side of the paper (No. 4), followed by application of heat to the opposite side (No. 5).

has adequate contrast for immediate evaluation. Conventional fixing later on increases the contrast, but it is said that the image is sufficiently stable without fixation. The residual developer in the paper is very small and in the dry state does not promote development of the background. (*Industrial Laboratories*, June, 1958, p. 67). —THE END

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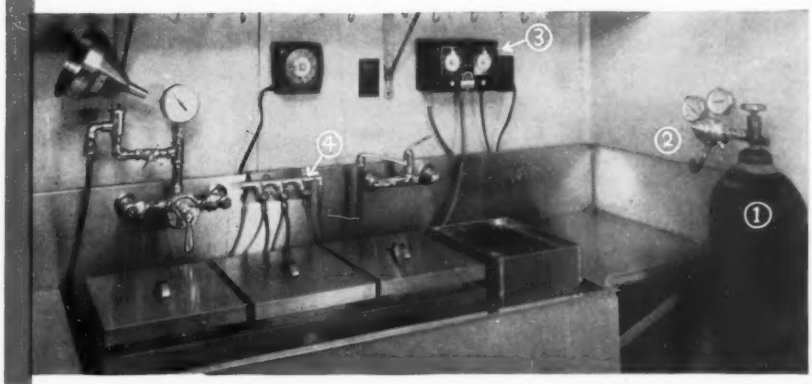

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by Arnold Eagle

INDUSTRIAL MOTION PICTURES

Slow motion and time lapse techniques condense movie action.

When the industrial photographer turns to film making, it is important that he stop thinking of motion pictures as an extension of still photography. He must learn to recognize the film as a medium in itself, capable of expressing ideas and influencing viewers in a way that cannot be done with stills. For example, the effects achieved by imaginative film techniques—the magic ways in which the invisible can be made visible—can never be duplicated by stills.

Take time-lapse photography, for instance. With this technique the photographer can demonstrate the snail-paced growth of a crystal vividly, leaving no doubt what a wonder it is. The technique consists simply of slowing down the camera speed while shooting an action, and then projecting it at a normal speed. All of which speeds up the action on the screen. A man may take four seconds to climb a ladder. But photographed at 12 fps, and projected at 24 fps (normal sound speed), the same climber will appear to sprint to the ladder top in a flat two seconds.

In time-lapse photography the slow camera speed is greatly exaggerated. If the rate of exposure is one frame each hour, an activity that is photographed over a 24-hour period will, when projected at normal sound speed, last one second on the screen. If you were to use such a camera set up to record the growth of a seed into a plant—a shooting period of approximately one month when exposed at one frame per hour—the scene would last half a minute when projected. To extend it to a full minute, the camera should be set at one frame every 30 minutes. The effect is truly startling! The normally invisible and active plant life jumps into sight as the plant struggles, reaches out to the light.

Requirements for the time lapse technique are fairly simple. First, a constant exposure must be maintained, and the quality of light must be constant throughout the shooting period. This means that daylight is definitely not a usable source because its intensity and direction change. Also, exposures would have to stop at nightfall. Second, both the subject and camera must remain rigidly on the same spot during the shooting and, since the camera cannot be moved, movement of the subject must be planned in advance to fit the established frame. You'll find a clock mechanism necessary to turn on the light and trip the shutter one frame at the set time intervals.

In most cases the film maker can construct his time-lapse equipment to fit the specific problem. Any good motion picture equipment repair shop will undertake to make a timing mechanism, it's true, but it probably won't be cheap. So, if you are mechanically inclined, try to rig up your own contraptions.

Animation Motors

Any camera with a single frame exposure device, or one that can be fitted with an animation motor, can be used for time-lapse work. Accurate through-the-lens focusing is important for close-up shooting and correct framing. In the 16mm field both the Cine Kodak Special and Bolex are fine. If you can afford them, the Arriflex, Maurer or Mitchell cameras are fitted with animation motors.

Exposures on single frame shooting may be tricky. Test them first! Usually, the automatic frame exposure is slower than when the camera is used for continuous run. For instance, when using the Cine Special, you must set the camera speed dial at 16 fps and calculate the exposure at 1/15 sec. instead of the normal 1/30 sec. As for floods, they should go on a few seconds *before* each exposure in order to give the light a chance to stabilize in color and intensity at the time of exposure. Incidentally, I see no reason why electronic flash couldn't be used effectively, synchronized with the camera.—THE END

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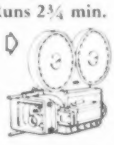

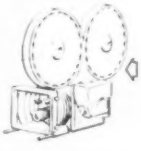

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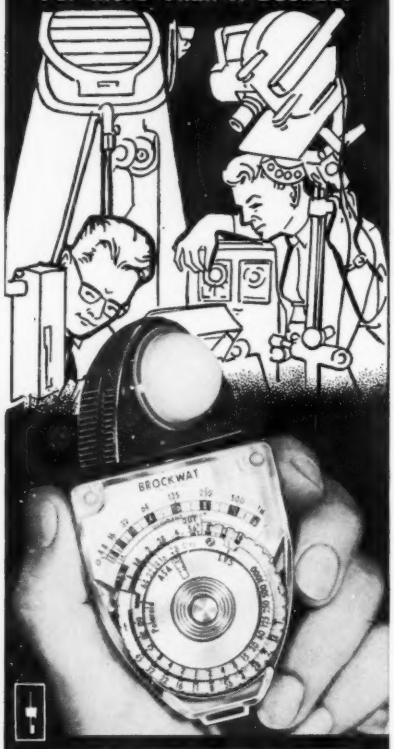

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Get more information. Circle 443, page 59

by Herbert P. Paschel

REPRODUCTION & GRAPHIC ARTS

Revolutionary letterpress technique: page proofs in a minute?

In the first public demonstration of a revolutionary letterpress (relief) platemaking system, a rapt audience witnessed the exposure and processing of a plate, ready for mounting and lock-up in a press, in less than twenty minutes. The data and experience accumulated during almost a year of field-testing of this new, photosensitive plastic plate was revealed by the Photo Products Department, E. I. Du Pont De Nemours & Co., on September 27, 1958. The report was made at the all-day Letterpress Forum, in New York, conducted via closed-circuit television and attended by over 2,500 printing industry personnel.

The basis of the process is a light-sensitive plastic which is normally soluble in an alkaline solution. When exposed to ultra-violet radiation the plastic polymerizes and becomes insoluble. Platemaking is simplicity itself. A conventional, high contrast negative containing text (line), or illustration matter (halftone), or both, is placed in contact with the metal backed photosensitive plastic plate and exposed to ultra-violet radiation for several minutes. After exposure the next step is to remove the unexposed and thus soluble plastic by means of a mild alkaline solution. This is quickly and easily accomplished by means of a washout tank in which the plate is pressure-sprayed with washout solution for about six minutes, followed by a water rinse. Processed plates may be left to dry naturally or force-dried by air blast.

The exposure equipment for flat plates may be the conventional white-flame arc lamp and vacuum printing frame presently used in platemaking departments. The latter, however, will require one slight modification. Common exposure frame glass absorbs a high percentage of UV rays: therefore, a sheet of UV transmitting "Cronar" polyester film is substituted. For rotary presses, processing equipment is used that exposes and develops plates in the curved state.

The remaining operations include—trimming the plate to size, mounting, and lock-up in the press. Rigid plates for flatbed presses are mounted directly on patent base. Press mounting of curved plates may be wrap-around, or attachment to one of a number of rotary press saddles.

Field evaluation involved some 1,300 plates, used under a wide variety of actual production-run printing conditions. The material printed included books, periodicals, business forms, newspaper supplements, and the like. Plate performance and durability was found satisfactory, in jobs ranging from 2,000 to 1,200,000 impressions.

When perfected and commercially available, photopolymer plates are expected to revolutionize the letterpress printing industry—both from the standpoint of everyday production and in the design of press equipment, especially rotary presses. In the latter case, the simplicity of producing a small, one-piece wrap-around plate will undoubtedly lead to the development of small presses in the field now dominated by the "offset" office duplicators.

The photopolymer plate will not necessarily be confined to printing uses. Templates, nameplates, matrices, stencils and decorative panels are but a few applications that appear likely.

Copy preparation of text matter for reproduction purposes by means of typewriters results either in unsightly copy with ragged right-hand margins, or requires double typing—the second typing being justified on the basis of word spacing determined from the first draft.

Operators of in-plant duplicating departments will be interested in a new device which converts typewritten copy into line negatives and justi-

fies the right-hand margin at the same time. Essentially a line-by-line camera, marginal justification is obtained by means of a unique, built-in optical system which automatically adjusts each line width to the common standard.

The Optype justifying line camera will reproduce 8½ x 11-in. typewritten copy at same size, or at reduced scale (down to 75 per cent of size) on sensitized film or paper. The type characters may be reproduced as they are or, by simple knob control, all lines or any selected lines may be italicized.

Operation of the Optype machine is quite simple. After loading with both copy and film the operator manually sets each line into position and, by viewing the line through a special scope, adjusts the marginal control grid to line up with the end character of the line. Through appropriate gearing, the optical system automatically adjusts to photograph the line at the pre-determined, preset width. The Optype machine, it is claimed, composes lines at speeds up to 1,000 per hour. Spacing between each line can be varied in accordance with the spacing requirements of the job. Any lines containing typing errors can be easily corrected or can be skipped.

Optype equipment is distributed in the United States by Consolidated International Equipment & Supply Company and affiliated dealers. The price is $6,950, f.o.b., New York, including installation and service warranty for one year. —THE END

ELECTRONIC FLASH

(*Continued from page* 10)

miniature cameras and that they combine flash and existing light in most cases rather than flash alone.

But electronic flash was everywhere. We toured the Kodak Nagel works in Stuttgart as personal guests of the engaging and erudite Nagel himself. A photographer equipped with the new Retina Reflex and a flash unit recorded the tour and had three pictures ready for each of us by the time we were ready to leave. Not group shots, but various intimate shots showing individuals inspecting the plant. The fact that it was so bright and clean made the shots even more pleasing.

The trip to the Braun plant in Frankfort was an exciting experience. Two belt conveyor production lines were turning out flash units at a rate which was easily between 500 and 800 a day, as near as my timing could indicate. All sub-assemblies were tested under working conditions and visually inspected. —THE END

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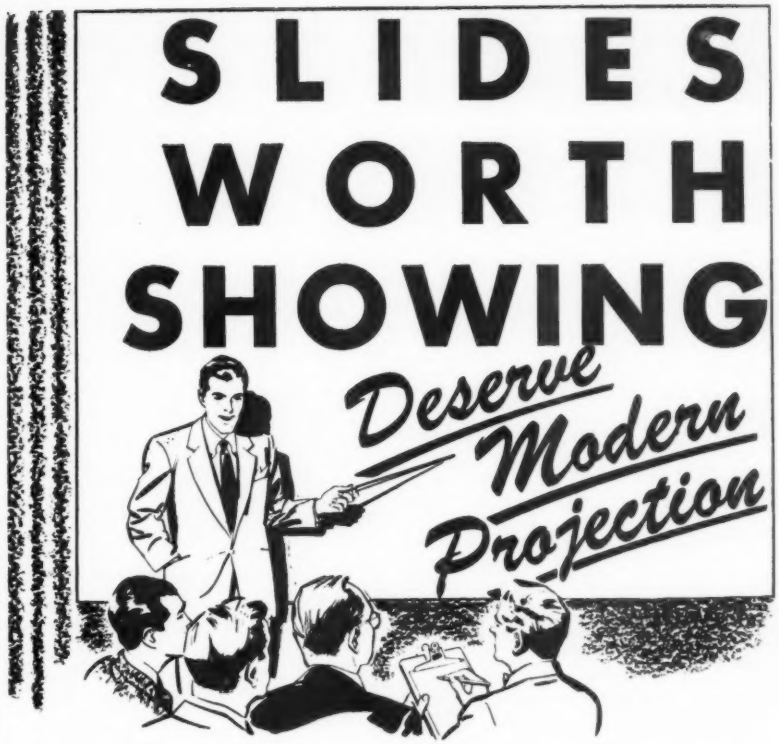

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by Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Report from Europe: Perutz, Adox, Agfa show new film materials.

Photokina's greatest promise to color users in the States, in our opinion, lies in new Perutz reversal color film. It has excellent saturation, is not excessively contrasty and is able to produce neutral greys (a tour de force for any color film). Best of all is its lack of grain. Samples in all sizes from 35mm to 8 x 10 sheets were shown. The film has an exposure index of 50 for daylight. Initially it will be available here in daylight-type roll film only. Larger sizes and tungsten will probably come later. The first imports are expected in the Spring.

A unique feature of this film is the processing. The Perutz Company plans to alter the film so that it can be processed in present Ektachrome E-2 solutions. (The change will decrease its exposure index to 32.) If this can be accomplished successfully, lack of processing facilities, a big problem for foreign film manufacturers, will be overcome. Since most color laboratories are processing Ektachrome they will welcome this new film and be able to give prompt service.

Adox showed a new negative color film with an exposure index of 40. This film seems to have the same characteristics as Agfa negative color material. It does not incorporate dye masking (as do Kodacolor and Ektacolor). It is comparatively fine-grained. Prints can be made only by the Adox Company.

Agfa also has an improved fine-grain negative film (exposure index 20, CN14), in addition to old one (e.i. 40, CN17). Also shown was a new tungsten film, an excellent new reversal paper and a new fine-grain color reversal transparency material (CT18), which makes a good 8mm movie film. The color negative paper, with an improved magenta coupler, made prints of excellent quality. The problem with this material is lack of lab facilities in the U.S. It will prove a big obstacle for Agfa.

A new automatic color printer, similar to the roll head printer now on the market by Kodak, was introduced by Agfa. The difference is that the tri-color exposure is simultaneous rather than consecutive. Each of the three separate light sources goes on at first and is then turned off one by one, according to the color balance of the negative.

Due to the high cost of stainless steel, especially in Europe, plastic is used in many of the processing units on display. This plastic is a form of polyethylene, called PVC, for polyvinylchloride. It is inert to photographic chemicals, very simple to keep clean, lightweight and much easier to fabricate than steel. It is available in processing units from small 1-gal. black-and-white set-ups to large 100-gal. continuous color jobs. PVC may eventually replace costlier stainless steel in much of our processing equipment. Since PVC comes in a rainbow of colors, the darkroom is apt to be a cosier place.

There seems to be a greater leaning toward negative color in Europe than in the United States. Prints are favored over transparencies and the trend is growing. Negative color in the United States is still in its infancy by comparison, but rapidly catching on. It is our opinion that quality of color prints from negatives in the United States is still better than with any European processes.

Color lab techniques in Europe, however, have the edge for simplicity. Some of the films are down to three-solution developing. Adox sells only one chemical (the developer) while the rest of the solutions are prepared from standard darkroom chemicals.—THE END

Address your inquiries regarding color photography to: Color Column, PMI, 33 W. 60th St., New York 23, N.Y. Please enclose a self-addressed stamped envelope.

by Ernest E. Reshovsky

PHOTO INSTRUMENTATION

Camera - carrying target drones check Air Force marksmanship.

Panama City, Fla.—The value of photographic instrumentation was again proved at the Air Force world-wide weapons meet held at Tyndall Air Base. At the meet, code named "William Tell," fighter planes of the Century series shot at supersonic target drones over the Gulf of Mexico by means of air-to-air missiles and rockets.

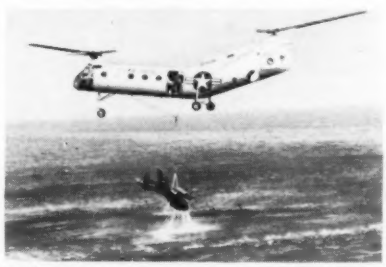
Scoring was done by electronic and photographic equipment and rocket firings were recorded by photographic means only. The jet target drones were equipped with Traid T-560 camera systems which were carried in the drones' wing pods. These 16mm cameras, running at 200 fps were started from the ground control center 10 seconds before the actual firing of the rockets and were kept running for 5 seconds after the firing. This intermittent shooting allowed the 200-ft. film supply to last through about three target passes, a sufficient length of time to arrive at a good evaluation. The f/1.5 3.45mm lenses covered a field angle of 165°.

After each target pass the drones were recovered, the cameras removed and the Anscochrome film rushed for processing on the base in one of the two existing prototype Houston-Fearless 20 RC processors. The first run took from 93-110 minutes with faster times on later runs after the film leader had passed through the processor. As soon as the film was developed it was run through a Vanguard M16C/C11 motion analyzer, for evaluation by the judges. This analyzer, which magnifies film 16X on a viewing screen and operates from 30 fps down to single frame viewing, gave the judges a perfect way of establishing hits or near misses from footage shot by the automatic equipment. The actual scoring was based largely on impact angles of the rockets. The films, whenever necessary, were slowed down or stopped for precise study.

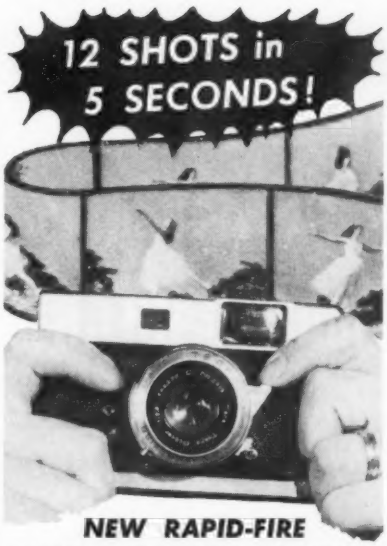
Since the drones, if hit, dropped by parachute into the Gulf of Mexico, the cameras had to be well protected. This was done by sealing them in plastic bags which left only the front element of the lens exposed after loading. The method worked so well that in one case a camera was recovered and the film found to be perfectly usable with correct color rendition after being submerged in 70 ft. of salt water for 25 hours. The order given to the recovery crews was to put the recovered cameras in a bucket of fresh water and deliver the whole pail to the photo lab. All film was given a fresh water rinse before processing.

Accurate pre-setting of cameras presented a problem. The men in the photo lab were responsible for this operation. They had access to all kinds of information, from meteorological forecasts to reports from pilots who cruised above the cloud layer. Estimates of exposure were close. However, some of the people we talked to felt that an automatic exposure compensating system equipped with a photocell would produce better color and take the guesswork out of lens-stop settings.

One rumor of interest to photo instrumentation engineers had it that some of the elaborate electronic scoring equipment in some of the drones for transmitting signals to the ground encountered occasional radio interference which made the recordings hard to read and partly unusable. But, on the whole, the photo scoring system came through the weapons meet with flying colors during operation "William Tell." —THE END



Old drone and the sea: operation William Tell. But where was the apple?



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AN EDITORIAL

THIS CHRISTMAS—GIVE A PHOTOGRAPHER

Some businesses are all business. Maximize profits and minimize losses is not merely their guiding principle but their only principle. Others, including some of the most successful in the country, take a different tack. Look, we're in business to make money, they say, but we're also members of a community. Not only does it salve our conscience to help out whenever we can; it often turns out to be good business.

That point is entirely up to management, but we do have some comments on how it may affect the photo department. Even though management may go so far as to assign executives to help in community projects, some business heads have no notion of the potential effectiveness of photo department help in public services. Indeed, many charitable groups have a crying need for photographs, but lack the money to obtain them. Ofttimes the industrial photo department is ideally equipped to help.

Under these conditions it's not surprising that many companies do supply prints, photo services, even undertake big photographic projects in behalf of worthy causes.

To avoid straining the quality of mercy, we suggest some ground rules. There should be a recognized need on the part of the community group, and the group should take responsibility for cooperation and effective use of the photographs. Care must be exercised to avoid acing a commercial photo house out of an account; there must be accord on the needs of the organization and their inability to pay for photos. If the company initiates the action, it had better take into account the feelings of the plant photographer. When he is wholeheartedly in favor of the project, the company should show him its appreciation—concretely. It often happens that the photographer takes the lead in such matters, donating his own free time. If the company is to share in the generosity and community gratitude it donates supplies and overhead, or even the photographer's time for processing. A company may wish to make its donation anonymous to avoid commercialism. This ordinarily shouldn't enter into decisions about giving individuals credit lines.

In any case, there are benefits for all. And not the least of these are for the photographer, who gets to flex his creative powers.

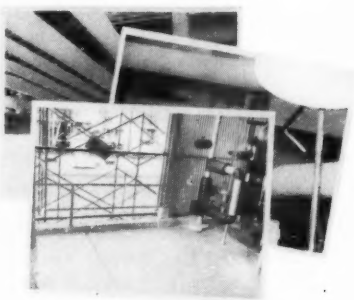
The Editors

PHOTOGRAPHY SIMPLIFIES DRAFTING

Intelligent combinations of photographs and technical drawing lead to efficient use of time and talent. Here are methods employed by Du Pont's Horace Maguigan

PLANT MODIFIED BY PHOTOGRAPH

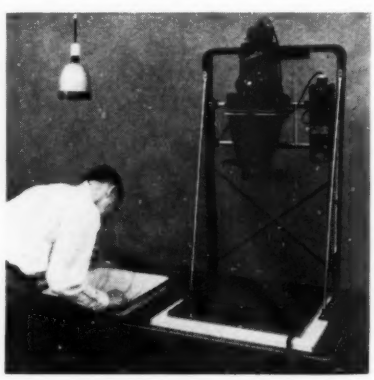
Plant modification is a continuing and often pressing job for Design Division of Du Pont's Engineering Department. Here's how reproduction and photography crew under Horace P. Maguigan speeds matters and takes a load off designer-engineers' backs. Designer-engineer *(below left)* has made preliminary study of sites for modification, has requested photographic aid, and



now goes over job with photographer John Driza. As Driza shoots, designer notes camera angles on old floor plan of site. Favored tool is 4 x 5 Graphic with 90mm, 135mm and 8½-in. lenses. Driza backs as far from subject as he can to reduce foreshortening, fills negative with longest lens he can use. Aim of fully detailed picture is achieved by employing existing light, bounce and/or extension flash to kill shadows. Shooting at or under "official" exposure indexes and underdeveloping brings excessively contrasty scenes to the range where negatives reproduce on normal paper. When outsider takes assignment, Du Pont asks for negative which will do just that.

Next step *(left)* is to put contacts or 8 x 10's in the hands of designer-engineer who selects those he wishes for final drawing of the plant modification.

Photographer begins this operation by exposing sheet of Cronaflex Projection Film to line negative bearing border and data blanks. Film is not yet processed. Instead, photog places negative made at site in Beseler enlarger, and composes a conveniently-sized image on vacuum easel *(below)*. Easel is homemade from a slab of



PHOTOS BY JOHN WILSON, LEWIS COLLINS AND JOHN DRIZA

Before the outbreak of World War II, the reproduction section of Du Pont's Engineering Department Design Division quietly hummed along turning out blueprints of drawings meticulously done on tracing cloth.

Came Pearl Harbor and the work of the Design Division zoomed while the output of engineering schools trickled and the military grabbed every man—technically trained or otherwise—they could lay their hands on. The design men at Du Pont were snowed under for they were called upon to plan construction for all the manufacturing divisions of the company.

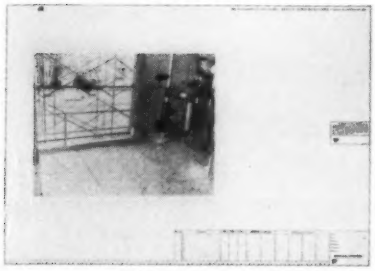
This crisis formed a challenge taken up by reproduction boss Horace P. Maguigan, and others. Mild, smart and efficient, Maguigan set up a section to apply techniques borrowed from photoengraving—stripping, opaquing, step and repeat, etc. to free the hard-pressed engineer designers from repetitious drafting.

Next Maguigan, as unlike an evangelist as any man you'd meet, spread the gospel. Sustaining himself on cough drops, he gave four one-hour lectures a day to get his ideas across to the tough-minded technical men.

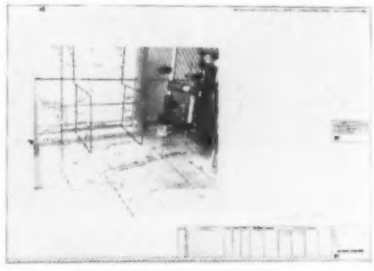
The ideas caught on. To this day, though, no engineer gets photographic aid in his draftsmanship unless he himself requests it, 30, possibly 40 per cent of the work done by Maguigan's staff is the photographic creation of engineering drawings. The rest is more or less standard reproduction—mostly photostats and straight blue- and white-printing. A careful accounting procedure assures the boss that the use of the camera is saving money over conventional methods, every time.

Here's Maguigan's report on the techniques used:

"At Du Pont, we began to use photo methods to make or help make engineering drawings during the thirties, and in 1940 established a unit—secton—specifically for this purpose, as distinct from Photostat, blueprint, and diazo work. Basically our methods were to make film or paper negatives from existing drawings, and to delete material from these negatives by opaquing the portions which would not apply to the new design. From these negatives we made prints on sensitized tracing cloth. These tracings were then turned over to the designer for completion. Initially we made our negatives in a contact printing frame



rigid plastic routed with an eight-inch channel an inch from the edge of the plastic. Channel connects (via hole drilled in front edge of plastic slab and hose) to vacuum pump. Photographer switches enlarger lamp off. He then places Cronaflex Film, which contains latent image of border, on the slab inside vacuum channel. Emulsion side is up. Grey or magenta 100-line screen goes over this; covers film, channel and all. Photographer judges exposure by experience. It averages 4 min. with 150-watt enlarger bulb. After litho-developer processing, film *(above)* is in form for designer's work. Image is light so pencil lines show on it. An eradicating solution (see text for formula) eliminates extraneous detail. Designer, having finished calculations, takes over on Driza's work. He draws in *(below)* a stylized diagram of proposed modification in pencil. This is the extent of his drafting for this particular modification. "Tooth" on film makes it possible for pencil to render lines sufficiently dense for direct reproduction. The finished result *(right)* is a diazo copy of the pencil-and-photograph translucent master. The company finds that their craftsmen are familiar enough with standard practices to do the job properly if given only essential dimensions and pertinent locations.



An alternative to the technique is to eliminate the use of a contact screen. The negative is projected directly onto the Cronaflex Projection Film, and the film is processed in a print developer diluted 1:10. Greater fidelity in diazos and blues is possible, however, if screen is used.

Maguigan cites the following advantages of the system: 1) Designer is spared making field sketches and then redrawing his data in the drafting room. This pays for the photo services and materials. 2) Photos reveal more about existing conditions than sketches possibly could, saving back-and-fill when the unexpected turns up. 3) The graphic treatment is easy to "read."

PHOTOS BY JOHN WILSON, LEWIS COLLINS AND JOHN DRIZA

SIMPLIFY DRAFTING *(continued)*

which limited us to same size work. We soon added a large process camera which provided a means of changing scale.

"One especially useful application was in the expansion of power house design. It is very simple, for example, to convert a design for a three-boiler power house into a four-boiler unit by making a negative of the drawing and an extra negative of the section showing boiler number two (*see illustration*) and stripping-in the extra unit.

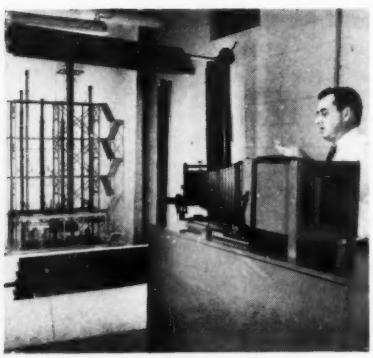
"It is also possible to reduce the number of components in a design by reversing the procedure.

"Another problem in this same category was the duplication of steel framing design. In this case the designer drew a portion of the building and asked to have bays two and three repeated five times. Sixteen different drawings were completed in this manner in one day. This was a considerable saving in drafting time, and enabled the engineer to furnish prints to the steel fabricator two weeks earlier than by conventional methods.

"This technique of expanding and contracting symmetrical designs was widely used during World War II, and I'd estimate that for power house work alone, we made at least 3,000 drawings in this manner.

"Numerous variations of this technique have been developed by combining parts of different designs and by splitting up parts of a design. Changes in scale are accomplished in the negative stage through the use of the process camera. A design can be reversed by making a right reading negative, and deleting all lettering. Reproductions

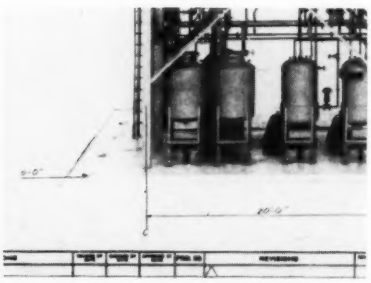
BUILDING A FACTORY WITH FEW BLUES



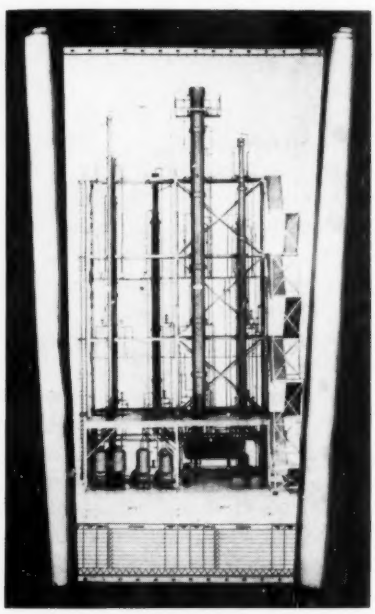
In some cases, Du Pont builds an entire chemical plant with only a few conventional blueprints. Secret is an accurate scale model made under designer's direction. Working drawings come from photos of front, side, top, four corners and details of model. Big problem is to eliminate foreshortening. Practically speaking, this is impossible, but photographer John Wilson approaches it by shooting 40 ft. from subject, making 4 x 5 negatives with a 35-in. process lens *(above)*. Two 6-ft. squares of fluorescent tubes light model and background. Negative is projected through contact screen to make halftone print on Cronaflex for designer's notations. Diazo copies or blueprints made directly from it are the working drawings with which construction crew puts up the plant.

Full-tone neg goes . . .

in enlarger for screened print



which designer completes . . .



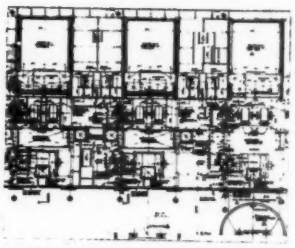
for diazos, with little drafting

from it are, of course, 'wrong reading.'

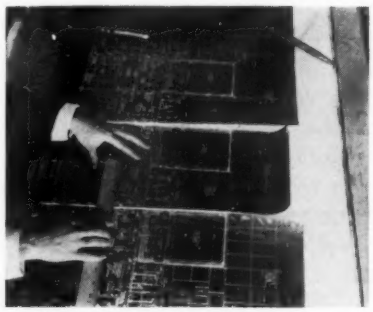
"The possibilities of utilizing existing designs, without laborious manual tracing, are practically unlimited. If a designer can cut and paste up parts of prints to form a basis of a new drawing, it can be made into a photo-tracing by preparing negatives and putting them together in the same manner.

"This is not a process which should be relegated to the blueprint room, however, since full exploitation of the possibilities requires the skill of the photographer. A knowledge of drafting practices will materially aid personnel engaged in supervising this work. In fact some of our men have taken extension courses to the point where they are qualified draftsmen. They prefer to stick with photography.

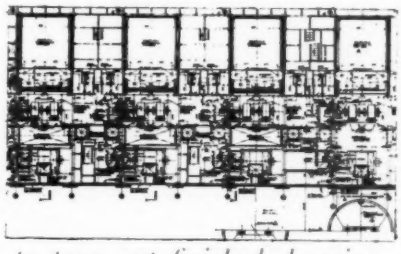
"Photography is also employed as a tool to assist the designer: in the use of photographs of unusual equipment and piping installations; to illustrate reports of field trips; in the preparation of slides for training courses; and through copies of aerial photographs printed to a scale for plant layout work.



Original had three boilers . . .



make a neg, add a fourth . . .



to turn out finished drawing

PHOTOS RENEW FILED DRAWING

Most companies specialize, and when there is specialization, the same job is apt to appear and reappear. In the case of the three-boiler power plant *(engneering drawing, top)*, Du Pont designers found original planning still sound. A new application required merely the addition of one boiler. Photo group made two paper negatives of old drawing, opaqued specifications and stripped in *(left)* a duplicate boiler between original boilers two and three. The joint between the sections of the drawing is a butt splice, accomplished by overlapping the negatives in register, slicing them with an X-Acto knife and joining them with transparent tape. You have to be an expert to find the seam in the Cronaflex film print of the negative *(below, left)*, shown at great reduction. Lettering and specifications complete the job. Final prints are diazo copies.

With variations the system may be used to subtract a boiler, reverse an image from left to right, or even splice together a number of pieces from existing work to make a new drawing.

"Our Engineering Department has used models for a number of years. First we used them to check drawings of complex piping and equipment arrangements, to make sure there were no interferences or conflicts in installation.

"Gradually we began to study the possibility of completing the piping on the model without making drawings and making photo-tracings from photographs of the model—to relieve the designer of copy work and permit him to concentrate on engineering details.

"Initially we tried to produce photo-plans using conventional models, standard cameras and lenses, and photographic tracing cloth. We found that perspective confused the planes of intricate equipment and that, while most equipment could be distinguished on straight photographic prints, we could not make satisfactory diazo prints from tracing cloth.

"Working with our model shop, we devised two refinements. Using flat grey paint for equipment, instead of the normal glossy black, we get more reproducible tones. The shop worked out a system for disassembling the models for detail views.

"We investigated several methods of transferring the photographic image of the model to a photo-tracing, and finally were satisfied when Du Pont Company's own Photo-Products Department developed the "Cronaflex" line of engineering reproduction materials. At present there are three emulsions available: Contact Speed, Projection Speed and Direct Positive which are coated on "Cronar" polyester photographic film base, finished in a matte surface. We're pleased to plug the product, and we're under no compulsion to use it. This material is tough enough to withstand the wear and tear of printing large quantities of prints on blueprint and diazo machines and the frequent handling which tracings receive in filing. It has exceptional dimensional stability and the drafting surface is excellent. The film is quite transparent, which permits making clear prints at high production rate.

"The photographic image is eradicated wherever the designer-engineer directs with any of the commercially available chemical eradicators which are designed to remove (*Continued on page* 55)

SHORT RUN REPRODUCTION

Problem: "Give us a hundred copies—8½ x 11—but fast!" Solution: Pour yourself a cup of coffee and take ten minutes to read Herbert P. Paschel's unfrenzied study of current low-cost methods for making duplicating masters from whatever the customer brings in

The choice of a copying or duplicating system can be a difficult and confusing problem, even for an expert in-plant reproduction man. Not only are there many methods and machines to choose from but the number of copies desired may vary from a single file copy to several thousand for a general mailing. Originals for duplication may be typed or handwritten letters; printed matter such as book, magazine and newspaper pages; various office, business and legal forms, and a variety of mechanical drawings and sketches. In addition to differences in size and shape, as well as in color of both image and base support, originals vary also in that they may be one-sided (copy matter on one side only) or contain matter on both sides. Because of such diversity in the character of the originals, and wide extremes in the number of duplicates needed, there is generally no one process or machine that satisfies all demands.

For the average non-engineering reproduction job where the number of copies from a given original does not exceed ten and the original is a standard stationery size the obvious choice is one of the simple, inexpensive reflex-type photocopying systems. The features of such methods were described in detail in the February issue of PMI. In terms of speed, minimum space requirements, ease of operation and reasonable initial cost, these so-called photocopy methods offer a more than satisfactory solution for the occasional, or minimum quantity copying job. But the cost per copy, from the standpoint of both time and money, is prohibitive for hundreds of copies.

For duplicating in excess of 100 copies there are, from a practical viewpoint, but three major office duplicating processes to choose from—spirit, and related fluid-type duplicators, stencil (mimeograph) and offset. They are listed tbove in the order of increasing print quality (legibility, contrast, resolution, wider choice of ink and paper, etc.), and printing master durability. Production potential of all three processes is approximately 6000 copies per hour. In the case of the spirit and related methods, the image forming substance is an integral part of the duplicating master and gradually becomes depleted. According to what is considered an acceptable copy, spirit masters are generally limited to 200 copies or less. Mimeo stencils, properly prepared and run, are capable of rendering thousands of copies. Offset masters, according to the type employed, range in production potential from several hundred to well over one hundred thousand impressions. Although several other methods could be cited the discussion will be limited to the above since almost every office has or can afford some such equipment.

All three permit creation of an original printing master by manual means—typing, writing and drawing. But facsimile duplicating, ie., reproducing existing material, requires intermediate operations and equipment. In some cases this can be extremely simple, in others quite complicated. The intent of this article is to review the available methods by means of which the average original can be converted into a printing master. Since the bulk of duplicating is confined to standard letter size, only machines and methods with an 8½ x 11-in. capacity will be considered. This limitation does not necessarily preclude the possibility of doing the same in larger sizes.

Regardless of the ultimate process, or intermediate operations, a facsimile master will require the use of one of three methods of conversion:

Photography: use of light-sensitive recording material of the silver-gelatin or electrostatic variety. **a:** Optical—focusing or fixed-focus cameras. **b:** Contact—reflex copying.

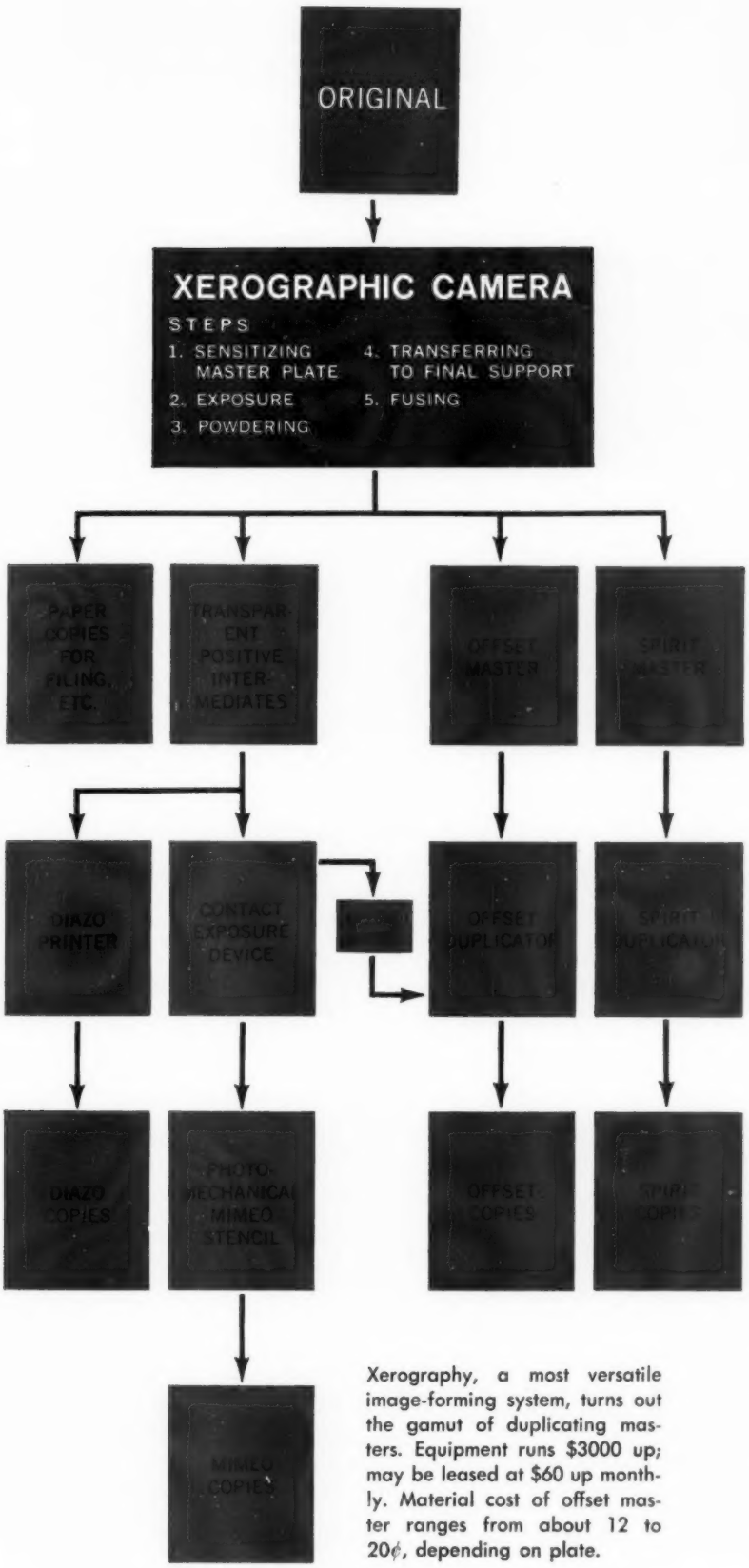
Scanning: **c:** electronic.

Conventional techniques

By means of suitable cameras, high contrast sensitive materials and conventional techniques, originals are converted into negatives or positives (line, and/or halftone). These are then used in any of the following applications—

1: *Negatives.* **a:** exposing conventional shop-coated or presensitized negative-working offset plates. **b:** making contact positives. **c:** exposing photoprints.

2:*Positives.* **a:** exposing conventional shop-coated or presensitized positive-working offset plates. **b:** exposing photochemical mimeo stencil. (A photosensitive mimeo stencil can also be exposed direct from copy in the camera). **c:** exposing diazo prints.



Xerography, a most versatile image-forming system, turns out the gamut of duplicating masters. Equipment runs $3000 up; may be leased at $60 up monthly. Material cost of offset master ranges from about 12 to 20¢, depending on plate.

XEROGRAPHY

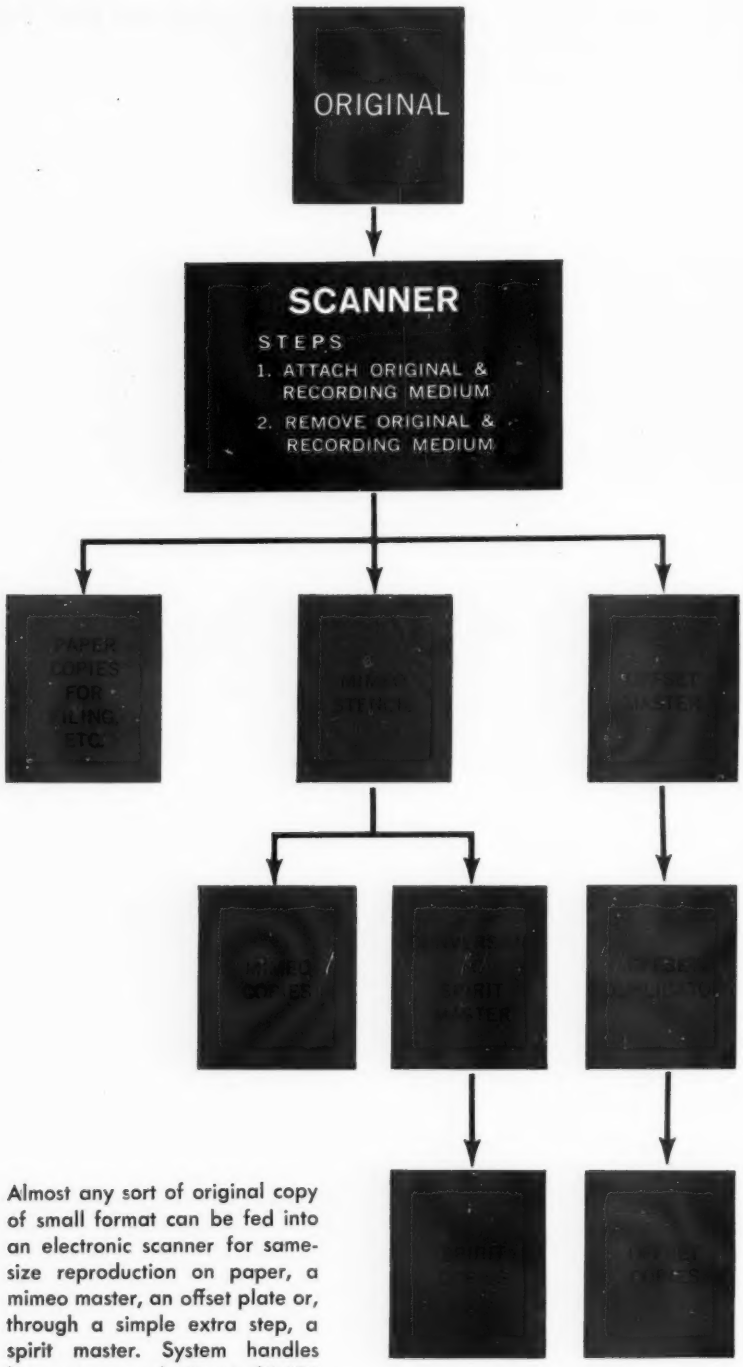
Xerography is a dry photographic process using an electrostatic principle instead of the usual light-sensitive films and papers. It does, however require specialized equipment which may be rented, ($60 to $125 monthly) or purchased outright ($3000 to $6000, according to type of equipment selected). An installation will serve a number of purposes. From one to eight copies on paper can be obtained from a single Xerographic exposure. According to the supporting surface selected the Xerographic exposure can, instead, result in an offset master, a transparent or translucent intermediate, or a liquid (or spirit) duplicator master.

To make a Xerox offset master the surface of a specially coated plate is sensitized by charging its surface with positive electricity. Upon exposure in the Xerox camera, either the focusing or fixed-focus model, the positive electricity is discharged from the plate in those areas representing the white (non-image) areas of the original. Negatively charged powder, when dusted over the surface of the exposed plate adheres only to the plate areas which retained the original charge. By placing a paper or metal offset master (at about 12 to 20¢ per master) in contact with the powdered plate and again positively charging the combination, the powder image is attracted to and adheres to the offset master. Heat treatment fuses the powder and forms a permanent positive image, with good definition and contrast.

The preparation of paper copies, directly, on a wide variety of paper supports, follows the procedure already outlined. Dusting of the exposed plate and transfer can be repeated up to eight times. Positive intermediates are produced by transferring the powder image to suitable transparent supports. In the latter case, since the supporting media cannot withstand heat, the image is made permanent by vapor fusing.

Masters for spirit and other fluid-type duplicators are made by transferring the powder image to the carbon side of a master set. By means of the Xerox Flow-set unit the powder image is transferred to the master and fused. The previous operation actually bonds the powder image to both the master and the carbon layer. Upon removal of the carbon sheet the master contains a Xerox image topped with the duplicator carbon.

(*Continued on the following page*)►



Almost any sort of original copy of small format can be fed into an electronic scanner for same-size reproduction on paper, a mimeo master, an offset plate or, through a simple extra step, a spirit master. System handles line or tone work. Cost is $1,695 up. Recording time, during which the machine need not be attended, is 6 to 24 min. Material cost of a paper copy is about ½¢; of mimeo or offset master 20¢; of spirit master, 25¢.

ELECTRONIC SCANNERS

A modern and most versatile method of image duplication utilizes electronic scanning. With any of the three machines on the market it is possible to prepare masters for all three duplicating processes and make single, dry positive copies as well, direct from practically any printed, typed or drawn original. Even continuous tone photographs and drawings are reproducible unscreened.

The scanners, all of which are similar in appearance and operation, have two cylinders, which rotate in synchronization. The material to be copied is attached to one drum, the recording media to the other. A small area of the copy subject is illuminated and this spot is scanned by a phototube. The differences in reflection are inversely transformed into amplified electrical impulses. Whenever the scanner sees black a spark jumps from the recording stylus to the recording media. The scanning head and stylus traverse the length of the respective cylinders, their paths spiralling in synchronization with each other and cylinder rotation.

The type of master produced depends entirely on the type of special recording media attached to the recording drum—recording paper, mimeo stencil or offset master. Both mimeo stencil and offset master are ready for immediate use after recording. In each case the operation of the machine is exactly the same and fully automatic, once the button is pressed.

A fluid duplicator master is quickly made using the mimeo stencil as the image converter. The stencil is placed between the carbon and master of a master set. The sandwich is subjected to heat and pressure in a heat press. This forces the carbon material through the openings in the stencil onto the master sheet. The carbon material forms the spirit image.

Recording time varies between 6 and 24 minutes according to the type of machine, scanning resolution selected, and size of copy being scanned. Material costs are approximately ½¢ for paper copies, 20¢ each for either a mimeo stencil or offset master, 25¢ for a spirit master.

According to the latest survey the scanners available for purchase are Stenafax, $1,895. (Times Facsimile Corp.). Electro-Rex, $1,695. (Rex-Rotary Distributing Corp.), and Gestefax, $1,995. (Gestetner Duplicator Corporation).

REFLEX PHOTOCOPY

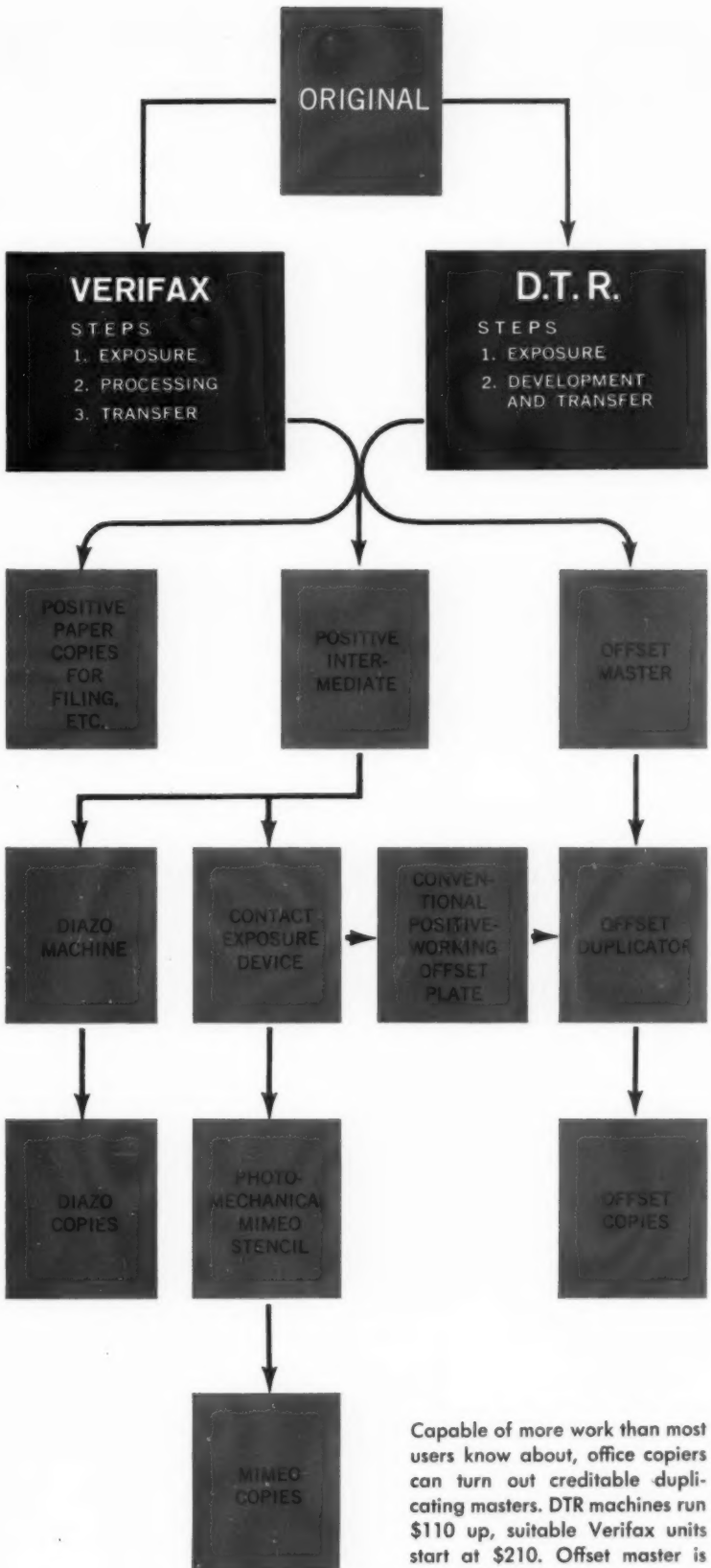
Reflex copying was devised as a simple method for obtaining negatives from opaque and two-sided line originals by contact, thus eliminating the need for a camera or other special apparatus. In its simplest form it requires no equipment other than that usually present in the photographic darkroom. The reflex method is so named because the exposing light passes through the sensitive material, strikes the original, and is differentially reflected back to the sensitive material. Where the exposing light strikes the blank areas of the original it is reflected back to the sensitive surface at maximum intensity. Where the original contains written, typed or printed matter there is little, if any light reflected. Thus, the exposure of the sensitive material is the combination of the transmitted and the reflected light. In the typical reflex exposure the emulsion side of the sensitive paper and the legible side of the original are placed face to face. The combination is then placed in a printing frame or contact printer with the base of the sensitive material toward the exposing light. In its simplest form the reflex process produces a paper negative which, obviously, can be used in applications normally requiring a line negative.

Two methods of recent introduction permit making offset masters and translucent positive intermediates by such simple steps as reflex exposure, single solution processing and transfer. In the one case, Verifax, transfer is a separate operation; in the other, DTR photocopy, processing and transfer occur virtually simultaneously. Both give similar results.

VERIFAX

The Verifax process is based on a special matrix material consisting of a soft gelatin silver emulsion on a paper base. In addition to the silver salts the emulsion also contains a tanning developing agent and color forming components. Following a conventional reflex exposure the matrix is immersed in a mild alkaline solution. Development has a two fold effect. The gelatin in the exposed areas is hardened (tanned) while the color forming components are activated to form a dye in both exposed and unexposed areas. The developed matrix and a special paper offset master are squeegeed together in a registering transfer

(*Continued on page* 64)



Capable of more work than most users know about, office copiers can turn out creditable duplicating masters. DTR machines run $110 up, suitable Verifax units start at $210. Offset master is about 40¢ for materials.

PATENTS

U.S. Patent 2,836,101: *Jan de Swart, assignor to De Swart Development Company, Los Angeles.*

A flexible lens with variable focal length is covered in this recent patent. In Fig. 1, the curvatures of transparent plastic diaphragms (12), as shown by the dotted lines, are controlled by the amount of fluid, either water or an organic

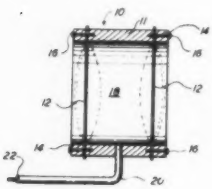


FIG. 1

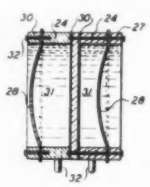


FIG. 2

liquid, in the chamber (11), thereby varying the focal length. A change of piston (22) position could be used to vary the amount of fluid through a tube (20) thus, changing piston position would change the focal length.

In another version, Fig. 2, the curvature of either end can be independently varied by incorporating two separate chambers.

Variations of these arrangements utilize differently shaped diaphragms set in at various angles are used to form random, abstract patterns for motion picture effects.

U.S. Patent 2,819,166: *Max H. Goldschein, Washington, D.C.*

A light-sensitive material for making positive prints, this invention incorporates within its layers a built-in processing laboratory. Water is the only ingredient which must be supplied.

Water soluble gelatin emulsions of developer and fixer are incorporated, in separate layers, on a water permeable base coated with a light-sensitive emulsion. Intermediate and covering gelatin coatings, of different thickness and hardness, isolate the "processing coatings" to provide a time delay mechanism for the release of the developer and fixer (Fig. 3).

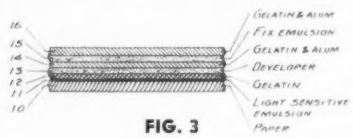


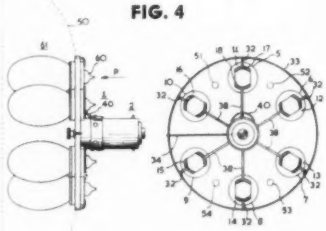
FIG. 3

The exposed material is placed in water which permeates the support, the light-sensitive layer, dissolves (and activates) the chemicals in the developer layer. After a time delay provided by the next more resistant hardened gelatin layer—during which time development has taken place—the fixer is dissolved and liberated to react with the light-sensitive coating.

U.S. Patent 2,833,876: *Reinder Westra, Netherlands, assignor to North American Philips Company, Inc., New York, N.Y.*

Load six flashbulbs in the same time it now takes to load one. This recent patent provides a means to get those bulbs into your flashgun faster—especially important for shooting situations where every second counts.

FIG. 4



With a standard mount to snap into any bayonet-type flashgun socket, this compact reflector head accommodates six bayonet-base bulbs, (Fig. 4). Preload any number of these holders and have them ready for instantaneous use.

After a bulb has been fired, the next one is readied for use by rotating the holder 60° to contact point (40). This is repeated until each of the six has been fired. The entire unit is then snapped out of the flashgun socket and replaced with another preloaded holder, thereby readying six fresh bulbs in a single step. This of course can be repeated as many times as you have holders.

The inventor states the possibility for varying the lamp sockets and holder plug to accommodate different types of bulbs and to use the holder with different types of flashguns.

U.S. Patent 2,813,457: *Harold Fitz Gerald, Los Angeles, Calif.*

Television has created an audience rather sophisticated in modern methods of criminal detection.

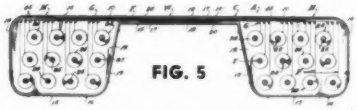


FIG. 5

Of interest to these criminologists would be this projector-viewer apparatus, (Fig. 4), designed to build, from separate features, a composite person for identification purposes.

As many as 12 transparent film strips can be used, (Fig. 5)—each with variations of one particular facial characteristic, e.g., ears, eyes, noses. These "facial segments" pass the same viewing area (W) and the image of the first selected characteristic is superimposed by the

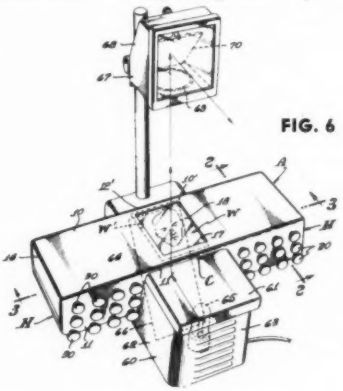


FIG. 6

Mad gimcracks or revolutionary photo methods? Nobody knows which patents are which until they're produced and tried out on such as you and me. Here author Eugene Ostroff presents his selection of the most intriguing ideas from the flock of photo patents issued in the past 14 months. See if you're the guy who "thought of it first"

second strip having the next selected characteristic and so on, until the desired composite has been created. Vertical and horizontal image adjustments for each strip are possible. It is suggested that the uppermost film, a blank, can be used for drawing additional characteristics or to trace the image.

U.S. Patent 2,801,279: *John A. C. Yule, Rochester, N.Y., assignor to Eastman Kodak Company.*

Continuous tone photographs are converted to pictures which resemble fine etchings or engravings with this Eastman Kodak electro-optical scanning system patent.

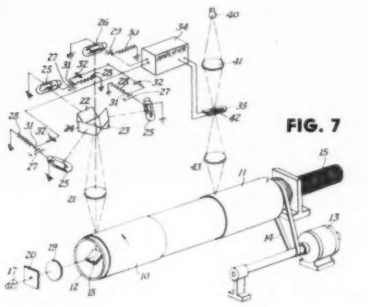


FIG. 7

The original (10) is scanned and the signal picked up controls the intensity of a light beam synchronously scanning a photosensitive material (11). Only abrupt density changes above a predetermined magnitude—a function of change of density with distance—activates the scanning light beam, thereby producing an outline effect.

In one version (Fig. 7), various areas of an enlarged image of the scanned photograph are projected to a number of different photocells (25, 26). "The output of the circuit is zero when the light intensity received by all cells is the same. However, when the intensity of light striking one of the outer cells (25) is greater than the intensity of light striking the central photoelectric cell (26), the circuit delivers an output voltage proportioned to this difference in intensity . . ." This signal controls light valve (35) which controls the exposure to photo material (11).

Thus, in a photograph where the main subject is in sharp focus and the background is blurred, the circuit could be adjusted to make an outline of the subject (abrupt density changes) and completely drop out the background (diffused tones, gradual density changes).

U.S. Patent 2,817,279: *Ivan W. Ellsworth and Kenneth S. Johnson, Framingham Centre, Mass.*

Photosensitive systems have established territorial rights in a large number of business offices. The increasing demand for small, inexpensive photocopy devices is reflected in this patent.

Exposure and dry (ammonia vapor) development both take place within this single unit. An aerated foam rubber pad (72) contains a series of large holes (74) to serve as reservoirs for dry, ammonia-generating chemicals, e.g., ammonia bicarbonate. This arrangement serves not only as a pressure platen but it also permits the ammonia fumes to diffuse through.

Fluorescent tubes (18) are the light source, above which is a glass tray (36). In one version, copy

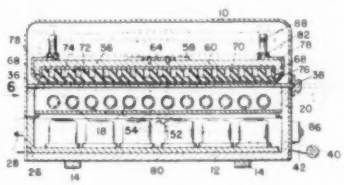


FIG. 8

material is placed on the glass, with the sensitized material face down over that, and the tray is slid into the apparatus (38). A lever (40) brings down the rubber pressure platen and simultaneously turns on the exposing lights.

Processing during exposure, the inventor claims, is possible when the original is of a porous material, such as paper, and the ammonia vapors can permeate to reach the photosensitive emulsion. For non-porous originals, after exposure, development of the photosensitive material must be accomplished by turning it over for exposure to the ammonia vapors.

U.S. Patent 2,826,634: *Ralph B. Atkinson, Beverly Hills, and Steven G. Ellis, Van Nuys, Calif; Ellis assignor to Atkinson.*

Ask any news agency man, picture scanning with photoelectric cells is old hat. But, in this recently

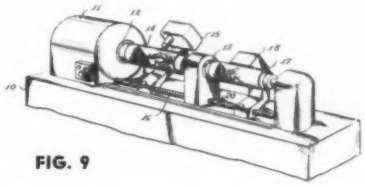


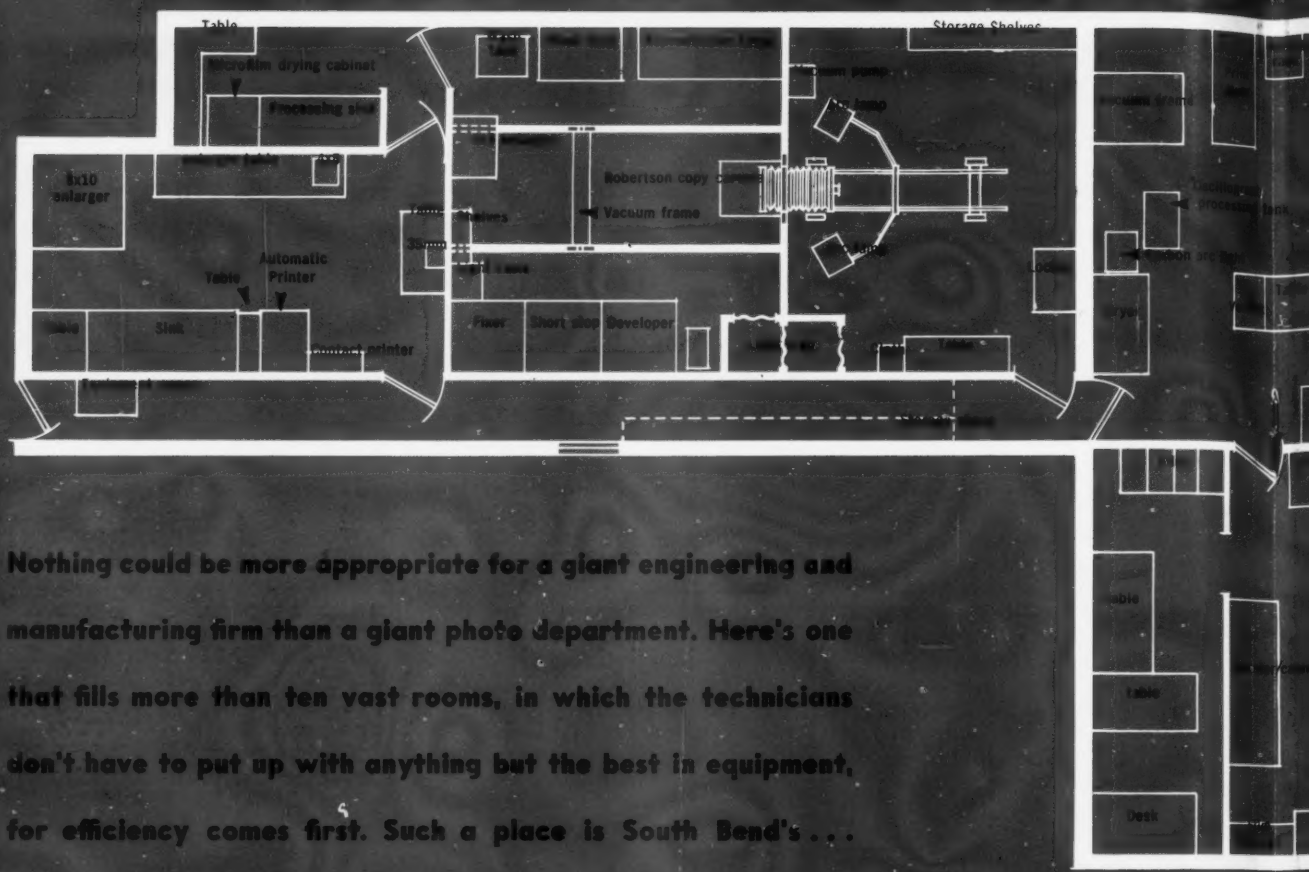
FIG. 9

patented system for "magnetic" picture reproduction, photosensitive materials are completely eliminated, heretofore a necessary adjunct to these methods.

This new method (Fig. 9) is similar to that used for wirephoto transmission in that the original picture is rotated and scanned by a small beam of light and photoelectric cell arrangement (15). Here the similarity ends because the cell output signal, instead of controlling the intensity of a recording-scanning light beam, is fed to a magnetic recording head (18) which simultaneously scans a synchronized rotating ferro-magnetic record (17). Thus, a magnetic record is made of the original.

The record is then removed and coated with pigmented ion particles which adhere only to the magnetized areas, thus forming the visible image. Finally, a gelatin

(continued on page 54)



Nothing could be more appropriate for a giant engineering and manufacturing firm than a giant photo department. Here's one that fills more than ten vast rooms, in which the technicians don't have to put up with anything but the best in equipment, for efficiency comes first. Such a place is South Bend's . . .

BENDIX PRODUCTS DIVIS

While you're still staggering from the size and intricate arrangement of the blueprint above, take a look at some of the production figures run up by the Bendix Products Division of the Bendix Aviation Corporation of South Bend. During an "average" month—and everyone knows how scarce an average month is—they turn out in the neighborhood of 4000 8½ x 11 Photostats, 3000 8½ x 11 line work negatives, 4500 photo negatives (both 4 x 5 and 8 x 10), 4000 contact prints, 2000 enlargements (8 x 10, 16 x 20, 30 x 40), 1500 sq. ft. of cloth reproductions of engineering drawings, and a miscellaneous catchall collection of color prints, color slides, black-and-white same, 16mm motion pictures, Polaroid prints and transparencies, and oscilloscope record shots. On microfilm—16, 35, 70mm—they don't keep production records; it goes on all the time, and aside from the kind of estimate that could be made from the amount of rawstock used, they don't even have big, round, guessed-at ballpark figures.

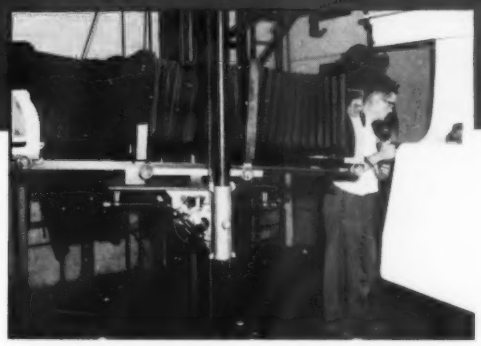
Under the supervision of Richard E. Wroblewski, the Photographic Section forms a part of the Engineering Records and Service Department, whose Manager, M. R. Clements, himself an engineer, has designed many of the handiest gadgets in use in the lab. We'll get to those later; right now the conventional store-boughten equipment makes an impressive enough list.

Before the Photographic Section was as completely equipped as it is, Wroblewski used to farm out some studio work. It was a great step forward for the lab when the outside studio went out of business. Wroblewski got the chance to buy up a pretty complete outfit, including some large cameras, lights, and other odds and ends. This was really the core of the present lab setup, and although there have been extensive additions, much of the original equipment is still around, making itself useful in its old age.

Basic to almost all the operation is the 11 x 14 Deardorff studio camera, with its satellites, the

Homemade electric elevator eases vertical parts shots.

Contact printer is as important as enlarger; much of lab's work is with large negatives.



3X enlargement on negative is standard job for 11x14 Deardorff studio camera.

GHQ: left, Ciesiolka, right, Wroblewski

8 x 10 Century View and the 8 x 10 Grover View. The Lab has a very definitely large-camera orientation, which is becoming rare nowadays, but for many industrial applications, makes sense.

Much of their work, for example, is concerned with parts pictures, exploded views and detail shots of intricate assemblies. They feel it's better to do as much enlarging right on the original negative as possible. For this purpose the Deardorff is racked out until it looks like a cross between a dachshund and a covered wagon, and the resultant picture enlarges the subject up to three diameters. The 8 x 10 Grover View is used for the same kind of work on location, while the Century lives more or less permanently on the home- or rather plant-made elevator, which acts as a monster camera stand for shooting verticals.

In 4 x 5 equipment they have two Speed Graphics and a Linhof Technika; motion pictures are made with a Bolex, and, when necessary, high-speed equipment is rented. Since they do enor-

mous quantities of microfilming, they use three microfilm cameras: a Recordak 16mm, a 35mm Kodagraph, and a locally-made 70mm job which they bought from the technician who made it. Dupes of 70mm are made on a Microtronics copier. The 16 and 35mm are commercially processed; the 70 is done in-plant, (Steinman System) which is handy. Inseparable companion to all microfilming operations is the Ansco Sweet Densitometer. Enlargers include an Omega D2, an 8 x 10 Elwood, and an Eastman Model B. A Simmon Omega variable Contrast Timer, with appropriate filters, and Polycontrast paper takes care of that end of the darkroom inventory and procedure.

One of the marks of a happy photo department is enthusiasm over their equipment. This is doubly true of the Bendix Products unit because if anything doesn't quite fill their bill they have the personnel with know-how and technical facilities to rip it down and build it to order from the ground up. It is therefore unnecessary to labor the point that they like everything they use or they simply wouldn't use it. Singled out for praise—mainly because they happened to come up—were the Davis & Sanford Floating Action Tripod, and the Robertson 24″ Process Camera. "When the Robertson people set up one of their cameras for you," said Wroblewski, "you say goodbye to them, because you never see them again until you want another camera." This testimonial to trouble-free operation extends to the bank of Color-Trans, Hunt's packaged chemicals—specifically their Graph-O-Lith developer—the Stouffer-McIntire printer, the uncoated blueprint paper they use for backgrounds, and the Verifax machine, which, says Wroblewski, is so handy they're kind of sorry they've got it. It encourages the "I'll-wait-for-it" type of client who clutters up a busy photo department and interferes with the planning of the day's projects and work schedules.

Among homemade equipment pride of place doesn't go to any one gadget; they're enthusiastic

FOUR STEPS IN WASH-OFF METHOD

1 When engineer requests duplicate tracing, negative is made by contact exposure on Du Pont Litho T photosensitive paper. Incandescent lamp in reflector provides sufficient illumination.

2 Negative resulting from this exposure is spotted and spliced and whatever changes or corrections are necessary are made. Composites made by joining negatives often reach six feet in length.

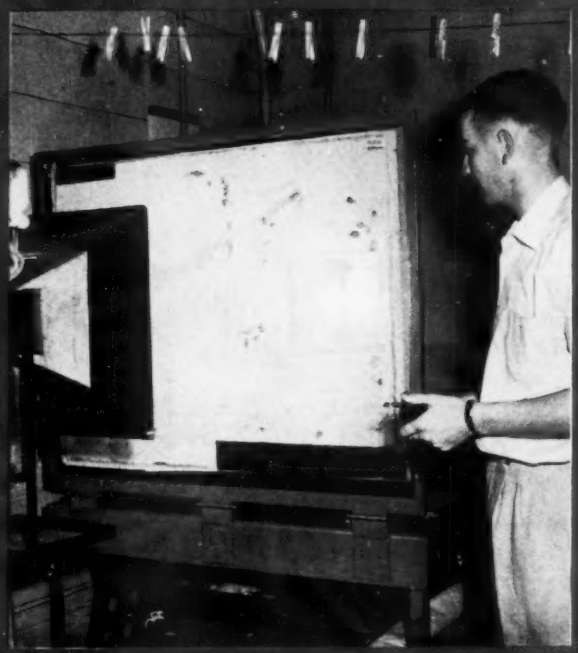
about their system of making photomacrographs with the view camera, about the Formica tables they use, their camera elevator, their projection table with cabinets underneath, the weights they've developed for handling 70mm microfilm in development, the one-operation viewer-cutter-filer for 70mm microfilm, and the ingenious roller dater—operates something like a letter cancelling stamp—that automatically rolls the date on the back of every blueprint and photostat that comes out of their machines.

Since a good deal of their operation is devoted to the reproduction of engineering drawings, they have given a good deal of time to the question of what is the most practical method for their needs. Wroblewski is most enthusiastic in his approval of the wash-off method, called for in some government specifications. In this, the tracing to be duplicated is first contact exposed on Du Pont Litho T material (photosensitive paper) and the necessary changes are made on the resultant negative. (In cases where there are modifications necessary; it isn't an indispensable part of the process!)

The negative is then contact exposed on Bruning Wash-Off Cloth, using a 90-amp arc lamp or the mercury vapor light source of a Bruning Whiteprint Machine. Transferred now to the "table"—a large sink—the exposed wash-off cloth is soaked in water, which softens the unexposed emulsion so that it can be sponged off. After this step the cloth is immersed in Bruning Developer, followed by a bath in a weak ferrocyanide solution, as a bleach. This actually finishes the process, but the Bendix people have found that fine detail can be brought up with much greater definition if the bleach is followed by a later treatment with water and compressed air, which takes off the last vestiges of unexposed emulsion, generally cleaning up the print for that added sparkle.

The way things are done at Bendix is fast and efficient, but technicians there are the first to point out that their way is merely the best for their particular problems. No two plants are alike; no two photo departments should be identical.—THE END

FOR ENGINEERING REPRODUCTION

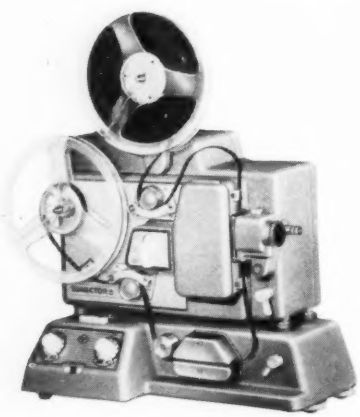


3 Litho T negative is then used to print on Bruning wash-off cloth. Light source here is 90 amp arc light, but alternative illuminant is the mercury vapor light used in Bruning whiteprint machine.

4 After wash to remove unexposed emulsion, print is developed in Bruning Developer, then bleached in mild ferrocyanide. Final step is water bath and air blast to clean up small areas of detail.

PHOTOKINA: PART TWO

PMI's scouts, who covered West Germany's recent monster camera carnival have come home and settled down, but it would be an exaggeration to claim that they had also simmered down. The first section of their report appeared in these pages last month; the second and last appears below. Type is inflexible, and the groans that went through the office last month at the items which space considerations forced out of the first installment were murmurs compared to the anguished howls at what had to be dropped from this final one. We try to give quality instead of bulk. We like to think we've skimmed the cream from the new items displayed at the show; and if some products just didn't turn out to be the right size to be included—well that should not be interpreted to mean PMI considers them a sort of skimmed-milk. This month's Photokina goodies include several new devices for AV use, ultra-miniatures for the use of spies and people on our side, meters to point the way to negative success, and developing and printmaking tools to prove it. We like every item we've reported. Let's not brood about the ones that got away.



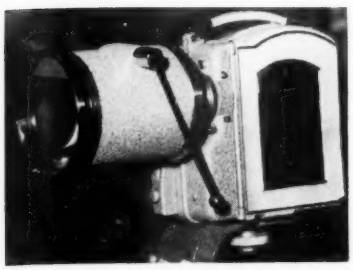
Agfa Sonector Universal 8mm projector uses recorded tape or magnetic striping on film for sound.

LINHOF 4x5 CONDENSER ENLARGER HEAD is designed to fit onto the Graflok-type back of the Linhof Super Technika IV 4 x 5 or the new Linhof 4 x 5 Color Camera when the cameras are mounted on the Linhof enlarger stand. The lower half is an alloy casting with double condensers, removable for cleaning. It is fastened to the Graflok back with the sliding locks on the camera. The upper section appears to be a spun aluminum shell containing a white enlarging lamp. There are plans to make it adjustable for different shaped lamps. It can be tilted to make distortion corrections. Specially mounted Schneider Componer and Componon enlarging lenses are available. The negative carrier fits into the place normally occupied by the double cut film holder. It is steel with glass plates. There is a curtain on the bottom of the condenser housing to reduce light leaks through the negative carrier slot. The halves of the negative carrier are connected at the inner end by floating hinges. By pushing the upper half of the carrier, the floating hinges cause the carrier halves to separate slightly so negatives can be slid in and out easily.

SAVOYFLEX: This, the only camera at Photokina with photoelectric exposure meter which automatically adjusts the diaphragm, was shown on the French Sito-Royer stand. It has a 50mm f/2.8 SOM Berthiot lens and a between-lens shutter with speeds 1 to 1/300 sec. Focusing can be done with a split-image rangefinder which is built into the focusing ground glass viewfinder. Here's how the completely automatic exposure control works: Exposure index of the film used is set on the photoelectric cell by covering it with one series of grids. Set the shutter speed and the diaphragm will adjust itself automatically to the amount of light striking the cell. Operation is automatic with shutter speeds 1/30 to 1/300 sec. The aperture setting appears on a small window dial on the side of the camera. A milled wheel shifts the operation to manual for use with slower speeds when desired.

BRAUN PAXIMAT S ELECTRIC PROJECTOR features an automatic remote control lens focusing device operated by pushing a button on the end of a long cord. The automatic slide changer mechanism which operates a slide tray is also remote controlled. Trays hold 36 slides. Lenses of 85, 100 and 150mm focal length are available. A 300-watt lamp is used and there is an accessory condenser set for projecting 4 x 4 slides.

LINHOF 2¼ x 2¾ PROJECTOR, made by Leitz for Linhof, is designed for the newly introduced picture format used in the roll film backs. It is a variation of the Leitz Prado and has the same features.



Camex Polyfoc converts standard 8mm camera lens (13mm focal length) to zoom lens. Not for wide-angle.

LEITZ PRADOVIT PROJECTOR, of metal alloy castings, uses plastic slide tray to allow semi-automatic operation at the touch of a button. A single motor, which requires no maintenance, drives both the fan and semi-automatic changer. A remote control cable allows slides to be changed from a distance. A 500-watt lamp will be standard in the U.S. Projection lenses of 85, 100, and 120mm will be available. The lenses and condenser systems cover the super-slide size transparency. Attachments to be available will allow completely automatic operation with slide changing at any fixed interval. Projector can be synchronized to a magnetic tape recorder.

MULTIBLITZ COLOR SL: This 65-watt-sec. unit draws power from a small (2 x 1½ x 1½-in.) rechargeable dry battery that is said to deliver about 50 flashes before being exhausted. According to the manufacturer, Gesellschaft for Multiblitz-Gerate Dr. Ing. D. A. Mannesmann, m.b.h., Westhoven bei Koln, the battery can be recharged about 30 times, thus giving a total of at least 1500 flashes for the life of the battery. Power use economy is achieved with transistor circuits and there is an automatic idling circuit. The battery is said to suffer no ill effects from prolonged inactive storage—up to nine months—other than to lose some of its charge. Light beam coverage is adjustable to either 50 or 75 degrees. The power pack is finished in grey plastic, measures about 5⅝ x 4¾ x 2 in. and weighs approximately 2 lbs., 3 oz., with battery.

Linhof Kardan-Color 4 x 5, mounts on rigid tubular monorail, uses all standard accessories, has all swings.

ARRI KODACHROME PROCESSING MACHINE: It is designed for continuous run, large production, such as 16mm and double 8mm movie processing. The controls have been designed to take over much of the responsibility for maintaining proper operation. There is automatic replenishment, temperature control, stirring, etc. Capacity is 25 ft. of 16mm per min. It utilizes a bottom drive. Price is about $50,000 f.o.b. Germany.

ROBOT RECORDER: An Arriflex 200 ft. cine magazine has been adapted to work with the standard Robot Royal 24 or 24 x 36 camera. The combination, plus an electric drive is called the Standard Robot Recorder. With the Royal 24 about 2,400 exposures can be had, the fastest continuous operating rate being 2 exposures per second. By addition of a suitable interval timer (not made by Robot) the camera can be made to fire at any desired interval. There is also a 40-ft. cassette available. For this type of work, Robot has a special camera which is stripped of viewfinder/rangefinder assembly on top of the camera. There is also a special model with which the picture image is 24 x 24mm, but the film is advanced 36mm. The purpose of this is to make it easy to have color slides processed and mounted in conventional mounts. The square picture comes out with rather wide black margins.

THESE ITEMS HELPED PUT THE

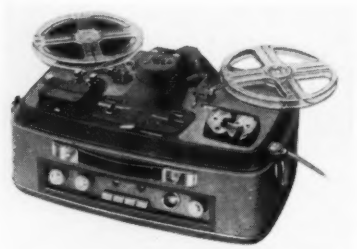
Color Densitomat two-button operating enlarger and copying device has automatic filters for color.

LINHOF MIRROR REFLEX ATTACHMENT For 4 x 5: Fits on the back of the Linhof Super Technika 4 x 5 and the 4 x 5 Color Camera, and also on any 4 x 5 camera with Graphic Graflok type back, to convert the press or view camera into a reflex. Focus is through the reflex housing. Either the housing or Linhof shutter assembly or both can be tipped to one side for viewing or for horizontal pictures. Minimum focal length lens for normal pictures is 240mm.

DIRECT REVERSAL DUPLICATING FILM (Ferrania, Contratipo Diretto): This is a new black-and-white reversal film which is said to give exact reproduction of tones from an original negative or positive. The development is extremely simple with none of the complications often connected with reversal type films. Agfa showed a negative color film, CN 14, with an ASA rating of 20 which, it was claimed, would yield better color photographs than their CN 17, and with higher resolution. Acutance is said to be on a par with that of black-and-white films. No word on when it will be marketed here. Also new in the Agfa line was Agfacolor CT paper print material, which makes prints from transparencies, equal in color to those made with color negatives. Color is corrected in printing.

EXPOSURE AND COLOR TEMPERATURE METER, by Lifa Lichtfilterfabrik, is no larger than an exposure meter alone. The color meter, sensitive to red and blue only, was designed to work with a special set of Lifa red and blue filters. To use, set dial on meter to color temperature of film being used, point meter at light source and revolve dial while watching a needle in window atop meter. When needle is centered, proper filter can be read from metal dial. Exposure meter needle is in the same window as the color temperature needle and must be zeroed in same manner to get right exposure on the meter dials. Lifa also has a color temperature meter alone, and a third called Lifacolorlux Baby which measures only from 2,400 to 11,000°K.

EYE-LEVEL PRISM for twin and single-lens cameras shown by Lane-Optik, Stockholm, Sweden, produced a bright, sharp unreversed ground glass image. The glass prism is made in West Germany and placed in the housing in Sweden. The image was good to the corners.

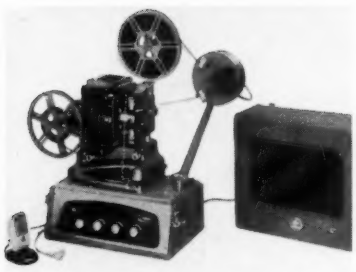


Visacustic 8mm combines magnetic recorder, slide projector, splicer-editor, sound/silent 8mm projector.

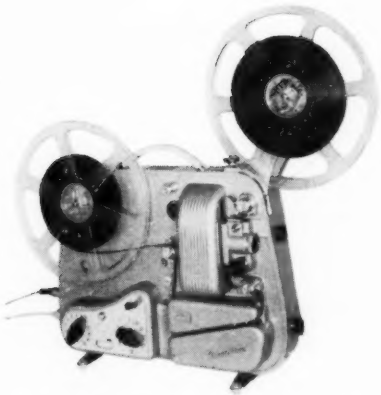
ROLL PROCESSING MACHINES There were several of these, each of which followed the American machines closely in style. Essentially they consist of motor head with controls, and two large vertical reels underneath. Long lengths of film (such as aerial film) are wound on one reel. Then the whole business goes into a tub-shaped tank and the film is wound through the developer solution and onto the other reel; then it reverses and rewinds. There were sizes for films up to 9 in. wide. Accessories, such as additional tubs, drying racks, etc. are available. The developing machines are made of stainless steel.

WESTROGON WIDE-ANGLE 24mm f/4 retrofocus lens for Exakta, Edixa, Pentacon and Praktica was shown by Isco Optische Werke. It opens to full aperture on the Exakta when the shutter button is released and on Praktica and Edixa when film is advanced. Isco also has completely automatic diaphragm normal lens, the 50mm f/1.9 Westrocolor and a tele, the 135mm f/2.8 Tele-Iscaron in automatic mount.

PHOTO IN 1958'S PHOTOKINA



Bolex Sonorizer converts Bolex 8 and other projectors to magnetic striped sound-on-film operation.



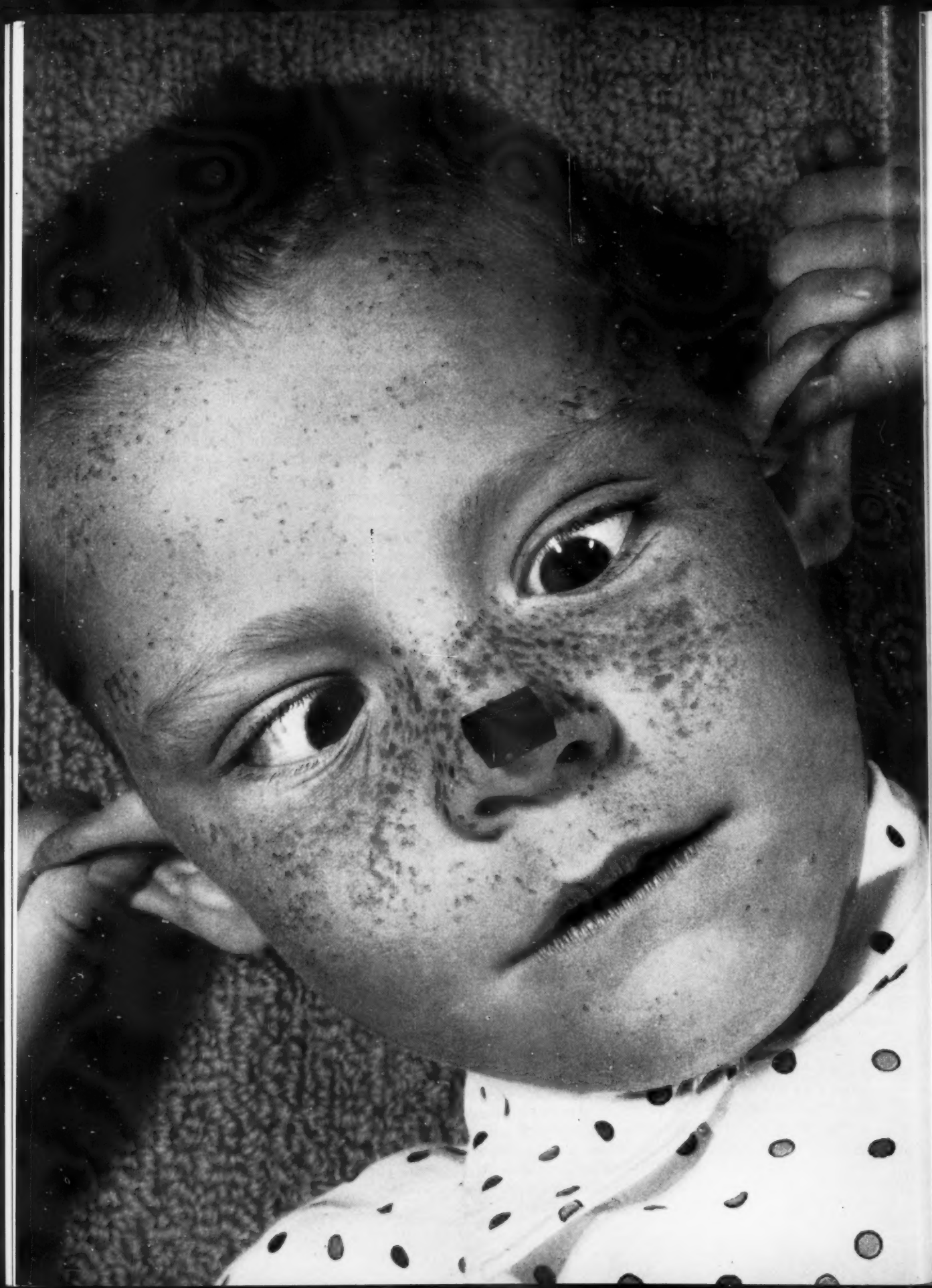
Zeiss Ikon Moviton 8mm uses magnetic tape pasted on film rather than coated; has fine frequency response.

ENNA OPTISCHE INTERCHANGEABLE LENS system for Exakta, Edixa, etc., cameras. Semi-automatic diaphragm mechanism with cocking lever, aperture settings and footage scales stays on camera—spring diaphragm operated lenses bayonet into single semi-automatic diaphragm unit. Lenses which fit the semi-automatic socket-wide-angle: 28mm f/3.5 Ultra Lithagon which focuses to 4″; 35mm f/2.8 Lithagon (also available in preset mount) focuses to 7″; 35mm f/1.9 Super Lithagon (also in preset mount) focuses to 7″. Normal lens: 50mm f/1.9 Ennalyt which focuses to 12″. Tele lens: 135mm f/3.5 Tele-Ennalyt and two preset lenses for single-lens focal-plane-shutter reflex: 200mm f/4.5, 240mm f/4.5.

DO-IT-YOURSELF CAMERA STAND KITS, come in outfits of either 80 or 160 pieces. They are built around sections of tough flexible spiral metal cable with threaded fittings at each end. Aluminum alloy angles, elbows, legs, etc., are added to cables to make various pieces of equipment. Flashgun brackets are easy to assemble and the outfit is useful to anyone doing macrophotography.

ROLLEX HOLDERS, "IDEAL" FORMAT SYSTEM: According to many people the "ideal" negative format would be one which exactly matched the proportions of the standard enlarging papers—8 x 10, 11 x 14, 16 x 20. The 4 x 5 negative does match this. The Rollex holders are designed to produce "ideal" format negatives in the following sizes: 2¼ x 2¾, 120 roll film and 70mm perforated film. The holders will fit on Linhof Super Technica 4 x 5 and 2¼ x 3¼ cameras, and on all other 4 x 5 cameras equipped with the Graphic Graflok type back. There are two basic Rollex types: The Super Rollex: 1. Takes any 120 roll film. 2. Delivers 10 negatives, 2¼ x 2¾. 3. Hinged back. 4. Film and backing paper wind around the unit inside out. 5 Paper is in close contact with a friction drum which puts a drag on it, thus forcing the film to lie flat in the film plane, by stretching it tight. The drum is also the the sensing mechanism for the exposure counter. 6. Conventional dark slide. Cine Rollex: 1. Takes 15 ft. of perforated 70mm film in daylight load cartridge, delivers about 50 2¼ x 2¾ negatives. 2. Solid back is part of the body casting. 3. Loading: Entire inner works comes out one side. There are two felt lip cartridges, one full, the other for takeup. Film is not rewound into the original cartridge but passes across into the empty one, takeup being done by rotating the inner spool of the takeup cartridge. Cartridges can be removed and film cut part way through a roll as desired. 4. Built-in rubberized curtain for dark slide, plus warning signals that indicate "closed" or "open". Of course, color films can be used with the Rollex. Linhof supplies 85 x 85mm slide glasses, paper masks and tape binders, described as dustproof. Rollexes for the 4 x 5 and 2¼ x 3¼ Linhof are not interchangeable. Both types have a large crank handle for a rapid film advance, with automatic stop, and both are so designed that the film counter goes to zero.

ARRIFLEX 16MM: ELECTRONIC VIEWFINDER: is akin to a TV monitor which projects on a screen the same field of view which the cameraman sees through the viewfinder. As the cameraman focuses, aims, pans, etc. the scene is reproduced on the TV screen which may be at some remote point. The director will in effect now be looking through the viewfinder too.



20,000 travel miles, 2,000 negatives, 60 color pictures

produce Minneapolis-Honeywell's all-at-once photo file

PORTFOLIO NO. 10

PRODUCT, MAKER AND PRESENTATION

World's tiniest (1/28 oz.!) electrical switch balanced on 6-year-old's freckled nose (*left*) was runaway favorite of 500 pictures serviced to editors out of 2,000 made by Jack Dennison (*above*), Honeywell's Chief Photographer, and Duane Andrews of Carl Byoir staff in year-long photo documentation of vast Minneapolis-Honeywell operations. Pick of negatives, blown up to 11 x 14, formed traveling show (*above, right*) for firm's employees in plants and sales offices all over U. S. and parts of Canada.

GROWTH and changes in any large industrial corporation make it difficult to maintain an active corporate photo file. At Minneapolis-Honeywell, this task in recent years has been complicated by the fact that the company has had one of the most spectacular growths in American industry. The lack of an adequate photo file became evident whenever it was necessary to produce an annual report, a booklet, dividend enclosure, certain advertisements and public relations material and in many other ways.

Since this work fell to the firm's public relations agency, Carl Byoir & Associates, account executive James Porterfield recommended complete coverage, mapped it out, made trial runs. Jack Dennison, Honeywell's chief photographer, and Duane Andrews, Byoir staff writer, were assigned to the job.

The project began in the spring of 1957. A total of 32 plants and sales offices in 11 cities were covered in the next year, an estimated 20,000 miles of travel. The results include more than 2,000 black-and-white negatives (of which 500 were ultimately submitted for prints) and 600 transparencies (150 subjects shot in four exposures each, bracketed a half-stop apart). All black-and-white set-ups were shot at least twice, and three-quarters of them four times: twice with electronic flash and twice in available light.

Time spent shooting varied from three days (in the larger

LADY IN A MAZE

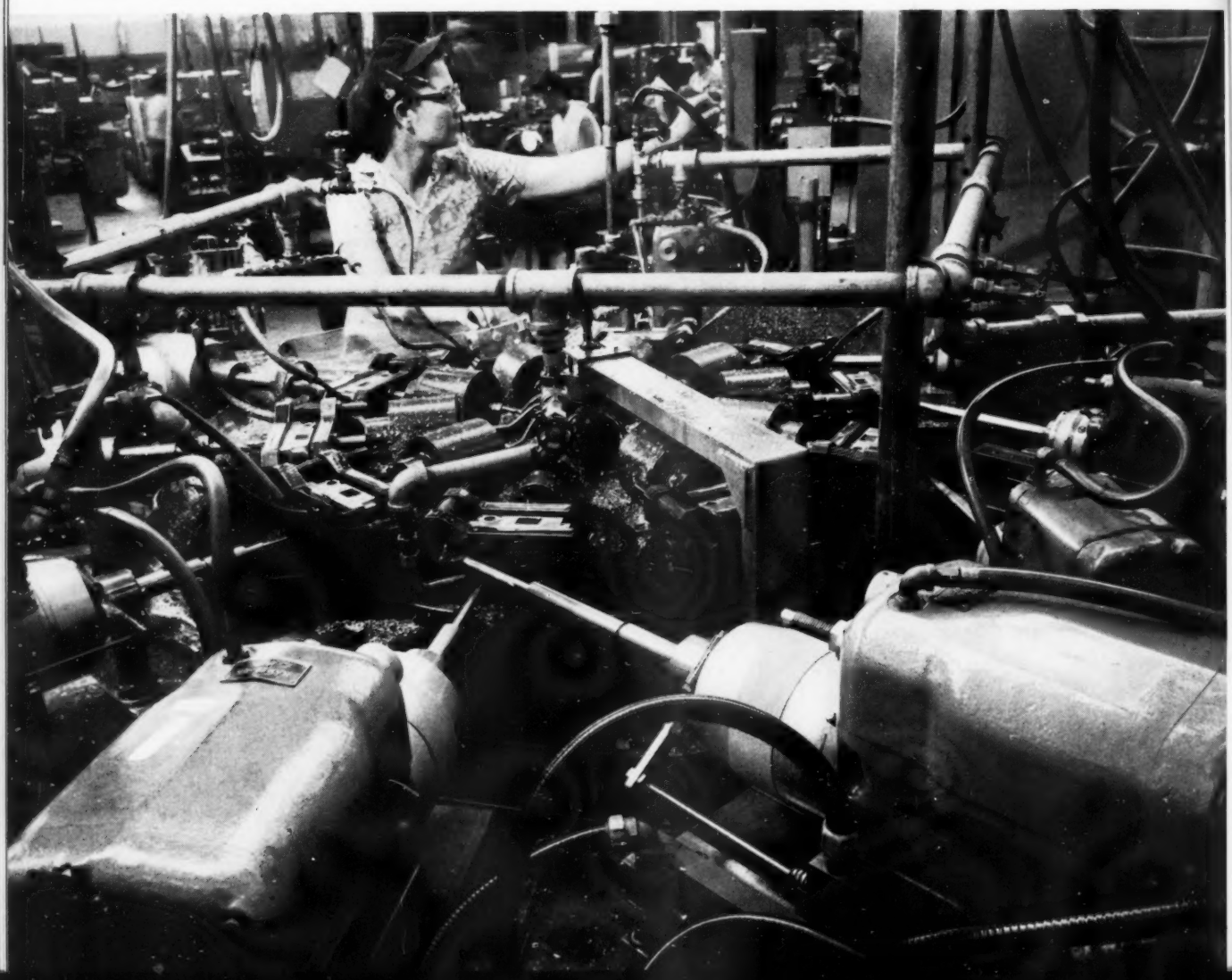
Winifred Shores seems unperturbed by complexity of moving parts around her as she operates huge automatic drilling machine, which performs nine different operations, at Minneapolis-Honeywell's Appliance Controls Division plant in Gardena, Calif. Theme of assignment given to Dennison and Andrews was "people at work." Most pictures were shot with electronic flash, then duplicated by available light. Most were made in color as well as black-and-white.

plant cities) to a single day at the regional sales offices. An average of 20 different black-and-white pictures (about 75 negatives) and six different color shots (representing 24 transparencies) were taken each day of the project.

For the project Dennison used a 4 x 5 Crown Graphic with an auxiliary 120 adapter back, for Daylight Ektachrome roll film. Lens equipment was simple: a 90mm wide-angle Optar and a 65mm wide-angle Optar, used with the roll film back. Three Heiland 91A Strobonar units and heads, approximately thirty 4 x 5 film holders loaded with Royal-X, Royal Pan and a variety of accessories, including tripod, cords, light meter, filters, etc., completed the outfit.

On 95 per cent of the black-and-white set-ups Dennison used at least two Strobonars at full power, and on all occasions he used the open flash method. This was done to make use of existing light for fill-in and to avoid possibility of synchronization problems. The same picture set-ups were also shot with existing light on Royal-X at a rating of 650.

First major use of the corporate pictures was in Honeywell's 1957 annual report, in which some 30 black-and-whites were



HUNDRED TIMES UP

This comparator, which produces an image on the screen 100 times larger than the component being projected, is used by tool and gauge inspectors at Minneapolis-Honeywell's Philadelphia plant to check dimensions of components used in industrial instruments. Joe McCleary checks the 30-in. screen to see that tiny part for use in control potentiometer comes up to specifications.

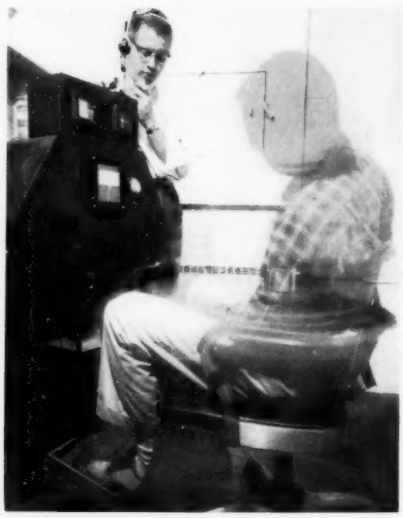
SPACE AGE HEADWEAR

Exhaustive testing of gyros used in rocket guidance systems makes use of thousands of dollars worth of electronic equipment, highly trained personnel, and a secret ingredient: time. As much as 24 hours per gyro are needed for final checks before shipment. Environmentally controlled area used by Honeywell at its Minneapolis plant and new St. Petersburg inertial guidance engineering facility totals more than 30,000 sq. ft. ▼

published. The report was judged the best in the automatic controls industry in the 18th annual survey sponsored by *Financial World*.

Internally, Honeywell has used the pictures in a special display at its annual Engineers' Night to show Honeywellers and their families the coast-to-coast scope of their company. The pictures are also featured in a new engineering and research recruiting booklet just published by Honeywell, and have been used in advertisements, dividend enclosures, internal publications and for many other purposes. Twelve thousand 11 x 14 prints of them have been produced by Honeywell's internal lab in Minneapolis. About 8,000 of these prints have been distributed to the company's various divisions or used for publicity, advertising, merchandising, etc.

Nearing completion is a corporate picture book containing contact prints of all the black-and-white pictures, along with one-line captions. These pictures are being dry-mounted six to a page, on black paper, then protected with acetate sleeves. Two loose-leaf notebooks are needed for the 100-page set. Sixteen of the books are being prepared, meaning that more than 8,000 contact prints are being proc- (*Continued on page* 55)



RESEARCH IN A SPIN

Whirling engineer will be stopped suddenly in front of new aircraft instruments to see how long it will take him to bring simulted plane back under control. These human aspects of the workings of a great corporation formed base of Dennison's assignment; technical part was up to him and Byoir photographer Duane Andrews.

◄ TINY ACORN, BIG OAK

Though complete Datamatic 1000 electronic data processing machine weighs 40 tons, occupies half an acre it is made up of incredibly delicate components. These facts, caught by Dennison's camera, form startling record.

PMI's 1958 INDEX

For the convenience of its readers, PMI has prepared this index to the articles which have appeared on its pages during the year 1958. Designed to help you find any article with a minimum amount of searching, this index has been separated into categories according to subject matter.

We regret that we can not offer back issues of PMI. In most cases the supply is exhausted.

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PROFESSIONAL MOTION PICTURE CAMERAS The eight most professional 16mm cameras	.....	Feb.	34
70MM DIRECTORY: A rundown on the cameras nobody knows	.....	Apr.	44
16MM PROFESSIONAL COLOR FILMS	Arnold Kotis	June	32

Industrial Color

Calculating Exposure With Bounce	S. Lang & L. Zoref	May	56
Color Efficiency: Ideas for slide making and new Type C literature	S. Lang & L. Zoref	July	18
Comment on Corrective Treatment for Color Transparencies	S. Lang & L. Zoref	Mar.	10
Filters and Factors to Skip the Gaps in Fluorescent Spectrum	S. Lang & L. Zoref	Oct.	10
First of Two Articles on New Positive-Negative Color	S. Lang & L. Zoref	Jan.	8
Go Ahead, **Print** Color Negatives! Processing tips.	S. Lang & L. Zoref	Nov.	48
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Negative Color Latitude	S. Lang & L. Zoref	June	14
Super Anscochrome, Tungsten Type	S. Lang & L. Zoref	Sept.	16
The Computer That Does Your Thinking For You—Or Does It?	S. Lang & L. Zoref	Apr.	16
Trends and New Products From Photokina	S. Lang & L. Zoref	Dec.	10
Type C Prints and Other Innovations in Negative-Positive Color	S. Lang & L. Zoref	Feb.	12

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Eagle explains editing routine; not difficult, needs care	Arnold Eagle	Aug.	82
Editing for the in-plant man	Arnold Eagle	July	50
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How to handle tricky problems of pans and tilts in cinematography	Arnold Eagle	Mar.	22
It's sync or swim when beginners plunge into sea of sound systems	Arnold Eagle	Sept.	48
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Industrial Motion Pictures

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Noisy nuisances make problems of location sound recording tougher	Arnold Eagle	Oct.	18
Time-lapse photography	Arnold Eagle	Dec.	20
Visual continuity, or how not to confuse the industrial audience	Arnold Eagle	June	52
Where to begin in the fast-growing industrial movie field	Arnold Eagle	Jan.	16
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Bethelehm Steel photographer reports on new Super Anscochome Tungsten	Leonard Ross	Feb.	16
Cinephonic 16mm	G. A. Grant	June	56
Flip Schulke tries Nikon's new extension holder	Flip Schulke	Sept.	53
Herman Slaybough tries a remarkable new processor—Oscar Fischer Spray Processall	Herman Slaybough	Oct.	65
Morris Gordon reports on the Sinar Professional	Morris Gordon	Mar.	52
Rolor 35-5 Color Print Processor	Raymond C. Bowman	Nov.	52
Simmon Tri-Color Computer put through its paces	Joseph Brehmer	May	66
The Super Graphic and the Mamiyaflex Professional C	A. Eagle & W. Lowenstein	Apr.	54, 66
Western Electric photographer tests the new Hasselblad 500C	Joe Gazdak	Jan.	36
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Color catalog lauded, speculation on 3-min. color squished	Lloyd E. Varden	June	20
Explosions analyzed, frame-rates indicated, and how long is a roll	Lloyd E. Varden	Oct.	16
Glimpse into the future of graphic arts	Lloyd E. Varden	Jan.	12
New copier; automatic dodging; longer life for projection lamps	Lloyd E. Varden	Nov.	16
New sequence timer "remembers" steps for photographic processing	Lloyd E. Varden	July	10
Photo-copying practices and the copyright laws —a short review	Lloyd E. Varden	Sept.	12
Photoscientist suggests some better packages for our chemicals	Lloyd E. Varden	Feb.	53
Photosensitive glass and other developments	Lloyd E. Varden	May	12
Printer with electronic technique	Lloyd E. Varden	Apr.	11
Progress in photography 1958	Lloyd E. Varden	Dec.	12

Methods for Tomorrow

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EXECUTIVE PORTRAITS 1855-1958 The executive face—and the changing role of the photographer	Carl Maas	Feb.	36
GRAPHIC FAILURES Protecting reproduction systems from gremlin attack	Herbert Paschel	Aug.	28
NEW YORK STAGES A-V WEEK Industrial A-V users convene, show their wares	.....	Sept.	42
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SHOULD YOU INSTALL YOUR OWN COLOR LAB? Photo chiefs debate the issue of in-plant color processing	.....	Mar.	36
SCIENCE NOTES News Briefs of Scientific Advances in Photography	.....	Sept.	46
SMPTE CONVENTION Motion picture men meet in Detroit	.....	Oct.	31
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Alcoa's Great New Movie ingenious cinematography makes an exciting industrial film	Les Barry	Jan.	38
Fast, Neat Splicing—Try Mylar Professional units for applying miracle splicing tape	Myron A. Matzkin	June	30
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No. 5—Efficient reproduction speeds map making	Benjamin March	May	32
No. 6—Four-man Mobilgas unit keeps hopping with films and photos	.....	June	24
No. 7—Raytheon's unit will tackle anything	.....	July	36
No. 8—Bob Schultz-Los Angeles one-man Band	.....	Aug.	32
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No. 10—United Air Lines, Chicago, Ill. starts a color lab on $30	.....	Nov.	28
No. 11—Bendix Products Division	.....	Dec.	34
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Air Force weapons meet	E. Reshovsky	Dec.	21
Day when tape replaces motion picture film is still far off	Ernest E. Reshovsky	June	10
Following the Regulus missile	Ernest Reshovsky	Apr.	12
Image converter plus Polaroid	Ernest E. Reshovsky	July	20
New equipment for photographing at intervals and around corners	Ernest E. Reshovsky	Sept.	20
Synchronized cine-and-sound tape camera suited for automation use	Ernest E. Reshovsky	Aug.	80
Ten seconds from exposure to picture with compact new unit-Thixotrol Processor	Ernest E. Reshovsky	Oct.	8
Tracking with the Hulcher	Ernest E. Reshovsky	May	18
X-ray photographs the atom; TV goes underwater in new housing	Ernest E. Reshovsky	Nov.	18
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Exposure in Ultra Close-Ups	Louis A. Facto	Nov.	24
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Here's How I Light It	Arnold Eagle	May	28
ID For Untrained Staff-Identification camera anyone can use	.....	Apr.	64
Industrial Photojournalism: Western Electric's Morris Gordon states his views	Morris Gordon	Sept.	24
Macro & Micro Photography Magnification photography with your 4 x 5	Bernard Hoffman	May	24
Meter Readings For Speed Flash All You need is half a ping-pong ball, $240 and ingenuity	Ernest E. Reshovsky	Nov.	46
Safety Snoopshots Photographing Accident Proneness	Photographer Bill Valdez	Sept.	50
Solving Twin-Lens Reflex Problems	W. Herman & J. R. Root	Apr.	28
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Creative photos in use at Cornell Research Institute	.....	June	40
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Two Eli Lilly photographers focus on industrial photojournalism	.....	Jan.	42
Westinghouse's John Merhaut and Robert Huntzinger	.....	Oct.	32

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Choosing lens for process camera calls for some preliminary study	Herbert P. Paschel	Oct.	12
Facsimile machines save time for the photographer	Herbert P. Paschel	Feb.	18
Guide to small format reproduction processes	Herbert P. Paschel	Dec.	18
Handy Andy for photo and reproduction tone alterations	Herbert P. Paschel	June	16
How to pick an offset plate	Herbert P. Paschel	May	10
It's system that makes it easier to track down processing faults	Herbert P. Paschel	Nov.	12
New tricks for the old dogs, normal platemaking technique	Herbert P. Paschel	July	12
New methods make halftone production easier and more convenient	Herbert P. Paschel	Mar.	14
Photo-Screener Transducer; Scan-A-Graver newspaper color system	Herbert P. Paschel	Sept.	10

Reproduction & Graphic Arts

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PXA lamps may be the solution to many graphic illuminant problems	Herbert P. Paschel	Aug.	8
Reproduction automation	Herbert P. Paschel	Apr.	48
Simplifying engineering drawing reproduction processes	Horace P. Maguigan	Dec.	24
The surprising electronic reproduction devices	Herbert P. Paschel	Jan.	20

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ASA E. I.—Now dangerously safe	Lloyd E. Varden	May	39
Color Duplication for Professionals	N. Rothchild S. Lang	July	40
Four Steps to Fine Quality	Mike Anguti	Apr.	36
Graphs No One Can Read—Sensitometric Curves	Lloyd E. Varden	Mar.	48
News Films: from lab to layout Royal-X Pan, Super Hypan, new Plus-X	Lloyd E. Varden	Nov.	42
On Photographing Air Disturbances-Shadowgraphs, schlieren and allied techniques	Eugene Ostroff	Aug.	16
Photo Fixing: Science and Practice	Eugene Ostroff	Sept.	28
Photographic Patents, 1958	Eugene Ostroff	Dec.	32
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Reciprocity Failure What it is and what to do about it	Lloyd E. Varden	Jan.	48

HOW TO SUBMIT MANUSCRIPTS

We're often asked if we buy material from readers. Sure we do; everybody does. PMI welcomes, and pays on acceptance for articles of interest and benefit to photographers in commerce, industry, education and government. If you do a short piece, say on how to ding up a prewar Speed Graphic so it'll hold the dark slide while you're shooting the picture—we'd appreciate seeing the complete story. If your idea is of wider scope, we'd rather see a one paragraph summary first. Manuscripts and queries are acknowledged on receipt by post card, we try to give decisions as quickly as possible on whether we'll buy your material. Unused material is returned *if* you enclose a stamped, self-addressed return envelope. Contacts or 8 x 10's are best for pictures. Written material should be typed. Rock-bottom price for a short or pic and caption is $5. We often do better.

PHOTO METHODS IN USE

TWO CAMERA TANDEM RIG SAVES TIME

To shoot quickly and eliminate fumbling for which-camera-had-what-film, Bernie Cleff decided to use two cameras mounted side-by-side for his assignment at the Pencoyd Steel Co., Philadelphia, Pa., one camera loaded with black-and-white film, the other with color.

This tandem mount holds the two cameras securely on a $^{3}/_{16}$ x 2-in. aluminum bar, drilled and tapped for ¼-in. #20 thread, which is a standard tripod thread. A tripod screw comes up through the hole to attach a "Zip Grip," which holds each camera.

The assignment called for pictures for the Annual Report, in addition to advertising and publicity shots. Therefore, it would encompass everything from candids of people in the testing labs (as well as the more formal portraits of the company's officers), to recording the blast furnaces in operation.

Balanced on top of a 20 foot high pile of firebricks of a pouring furnace, or standing 10 feet from an oven for heating forgings at 3000°, Bernie Cleff had good reason to appreciate the ease and efficiency of the tandem mount, which enabled him to concentrate on the picture—not complicated equipment.

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ONE LENS WITH 3 FOCAL LENGTHS

for Industrial Shots, Architectural Studies, Illustrative and Commercial Photography

Series Ia Triple Convertible Raptar

This photo was made with 13" f/6.8 Series 1a Raptar.

Photo taken from same camera position with rear element alone—focal length 20".

Photo taken from same camera position with front element—focal length 25½".

THE 3-IN-ONE LENS . . . the Raptar Series 1a Triple Convertible is an exceptionally useful lens for commercial photographers because of its large coverage, extreme adaptability and the versatility of three focal length lenses in one. Separate diaphragm scale on front plate for each half of the lens. Focal lengths from 6½" to 25½".

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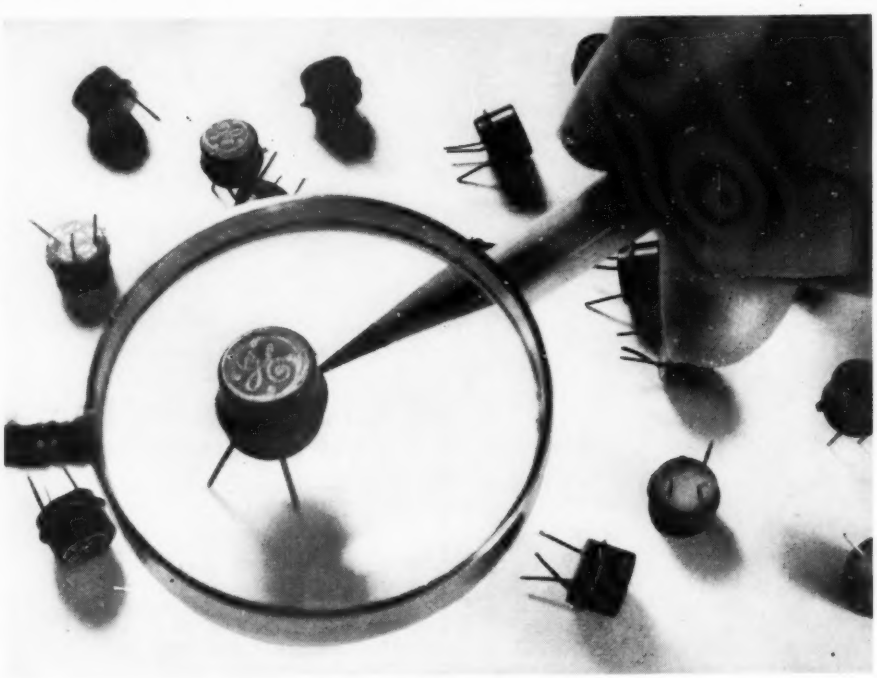
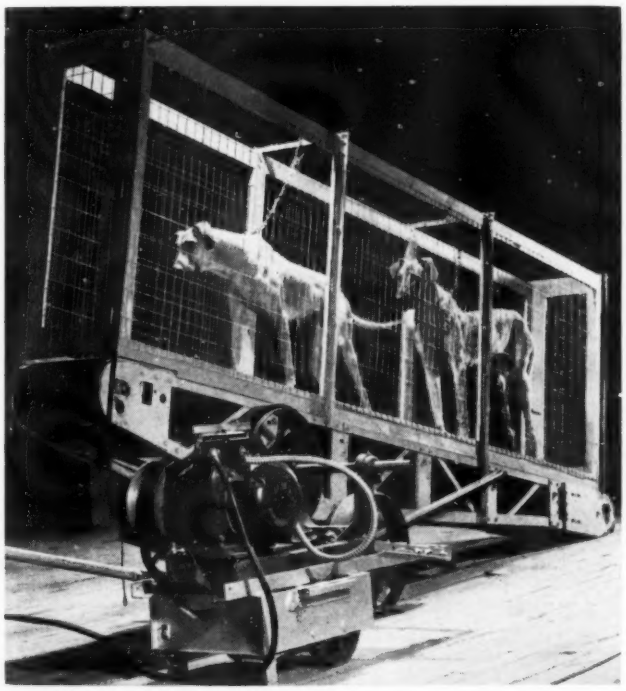
GARY R. WARSTLER, Republic Steel Corp., Massillon, Ohio, took this shot for the *Republic Reporter* to illustrate the Lighter-Than-Air Club of Akron, which made Saturday balloon flights via Republic furnaces' coke oven gas. 4 x 5 Speed Graphic, Tri-X, f/16, 1/200.

RICHARD H. ALTOFF, a Flushing, N. Y., free-lancer, used a Rolleiflex for this shot of a wagon drill and crew and the textured pattern created by the serrations of two different drills in excavation for a New York theater. Tri-X, f/22, 1/250.

JOHN ROSS, Schenectady, N. Y., free-lancer, showed skill with a routine subject on this assignment to picture transistors to be used in promotion literature for the Electronic Tube Dept. of General Electric Co., in Syracuse, N. Y. 4 x 5 Speed Graphic, 90mm Schneider Angulon lens, Royal Pan film, flood lighting, 1 sec. at f/11.



BOB RAMIREZ, of Rothschild Photos in Los Angeles, made this eye-catching design for Westinghouse Electric Corp., of a man cleaning parts on a giant rotor for a huge generator. 4 x 5 Graphic View camera Royal Pan film, Kodak Ektar lens, f/22, 1/200. Two GE No. 5 bulbs.



LOUISE BOYLE, Ithaca, N. Y., free-lancer, shot exerciser used in nutrition experiments at Cornell U., for A. B. Farquhar Co., who made conveyor. Problem of showing dogs through wire solved by placing No. 22 flashbulbs above, side and side front. Zeiss Juwel, Royal Pan, f/32, 1/200.

PMI's Monthly

READERS' SHOWCASE

PMI's readers supply solutions to industrial photo problems

The five pictures on these pages this month, in addition to being technically excellent, are good examples of the types we enjoy receiving. There is an interesting handling of a routine subject, nice use of texture and design, an arresting, almost other worldly, quality about the shot of the two dogs, and an unexpected, rather humorous feeling about the ascending balloon. We'd like to point out, however, that four of these pictures were made by photographers working on a free-lance basis. What's happened to the staff industrial photographer? Why is he so outnumbered? Probably because he's been meaning to send in some pictures, but hasn't quite gotten around to doing it. Why don't you who are staffers choose the pictures that have been unusually satisfying to you—they will likely affect us the same way—and send them in. Staff or free-lancer, your best pictures will never be viewed by a more interested group than your fellow readers. Entries not used will be returned.

You are invited to send in your pictures for this feature. Here are the details:

There are two rewards for each of the pictures chosen. The first is knowing that your picture will be seen by appreciative fellow professionals. The second is $10.00. Please include your name and your company's name, a note about the picture and how it was used, and the technical data. Send them to SHOWCASE, PMI, 33 W. 60, New York 23, N. Y.

PATENTS

(continued from page 33)

coated or sized paper is pressed in contact and the powdered image is transferred. The coating and transfer operation may be repeated a number of times for additional copies without rescanning and the same record may be reused for new scanning.

Various arrangements of opaque or transparency materials: with enlargement or reduction; from positive or negative originals to positive copy; with contrast and brightness control. For color copy, the original is scanned several times through the appropriate optical filters and with the appropriately pigmented powder each image is put down in register on the transfer paper.

In one variation, for direct positive copies, the first developer is an alkaline solution with a silver halide solvent (hypo) which develops a hardened gelatin and silver image in the exposed areas only. The second developer is an alkaline solution containing a hydrazine compound and a gelatin tanning inhibitor (sulfite) to give an unhardened image in the unexposed area.

U. S. Patent 2,813,452: *Hans Laube, New York, N.Y. assignor to Hans Laube and Bert S. Good, New York, N.Y.*

In the future will "grade B" motion pictures smell sweeter? They will—that is, if this patented device is installed in motion picture theatres.

Synchronized with motion picture projection is this device to emit any one of a number of preselected odors into the theatre auditorium. On one embodiment, the projected cine film is edge-marked to provide frequency signals which cue the proper odor emission valve. To prevent audience confusion, a "neutralizer" is used between odors.

U.S. Patent 2,835,575: *Herbert B. Cowden and Albert W. Wise, assignors to Eastman Kodak Company*

This new image transfer process, patented by Kodak, designed for office copy work from either negative or positive line or half-tone originals, gives negative or positive copies.

On version, as shown in Fig. 10, works in the following way:

The unhardened direct positive silver halide emulsion shown in Stage 1, which contains a gelatin

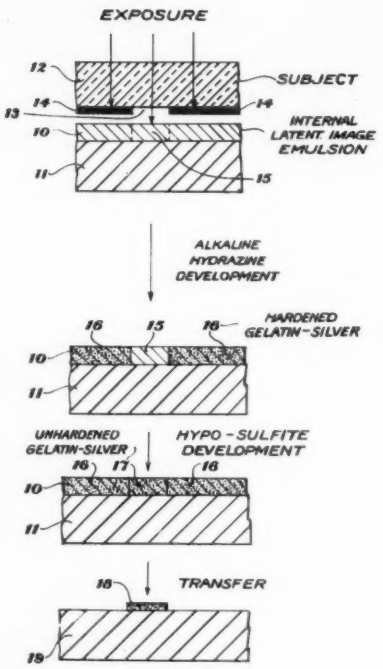


FIG. 10

tanning silver halide developing agent, is exposed to the original (12). In Stage 2, the unexposed (10) portions of the emulsion are selectively developed and hardened (16) in an alkaline solution which contains hydrazine. A second solution, Stage 3, develops an unhardened gelatin and silver image (17) in the remaining regions. A print, Stage 4, is made by squeegeeing and pressing the emulsion against a blank sheet of paper and peeling off the print. This transfers a thin layer of the unhardened emulsion to the paper and gives a negative copy. This transfer step can be repeated for additional copies by rewetting the emulsion in the second solution.

The first "developer" in this case is an alkaline solution of hydrazine and the second is an alkaline solution with a silver halide solvent (hypo) to dissolve the surface of the silver halide grains and uncover the underlying internal latent image and gelatin tanning inhibitor (sulfite).

U.S. Patent 2,839,400: *Alexander J. Moncrieoff-Yeates to Radio Corporation of America*

An improved method of electrostatic printing and developing has recently been patented by Radio Corporation of America. High sensitivity and substantially faithful reproduction of the original optical image along with better differentiation in subtle shades and color tones are claimed for this new method. Also, images will not tend to overdevelop along the image area edge while leaving the solid areas relatively under-developed—long troublesome problems in other electrostatic systems.

In one version (Fig. 11) the electrostatic image is made and developed in a single operation. The upper electrode is of a transparent electrically-conductive layer (27) e.g., tin chloride on glass and a layer of photoconductive insulating material (29), e.g., selenium. The lower electrode with uncharged developer powder (31) on its upper surface. A positive voltage is applied to the conductive layer (27). An optical image is projected from above through the conductive layer (27) onto the photoconductive layer (29), forming an electrostatic image. Simultaneously, a negative charge charges the developer powder (31) negatively, and these particles are immediately attracted to the positively charged areas of the

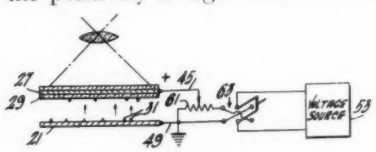


FIG. 11

electrostatic image on the photoconductive layer (29). A receiving material e.g., paper, can be put in contact with this surface and the powder image is transferred and fixed.

—THE END

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PORTFOLIO NO. 10

(*Continued from page 46*)

essed by Honeywell's photo lab. The books are to be distributed to major Carl Byoir offices (New York, Washington, Chicago and Los Angeles), Honeywell's six advertising agencies, selected advertising and sales promotion executives at various locations and others in a position to make maximum use of the pictures.

Dennison's final word of advice on such a corporate-wide picture project is: "Shoot any and all pictures that present themselves if they have even a remote possibility of being worthwhile. On such an extensive picture project as this, film is a minor part of the cost. It's better to shoot a picture that doesn't measure up to expectations than to miss an excellent shot just because it seems like a waste of film." THE END

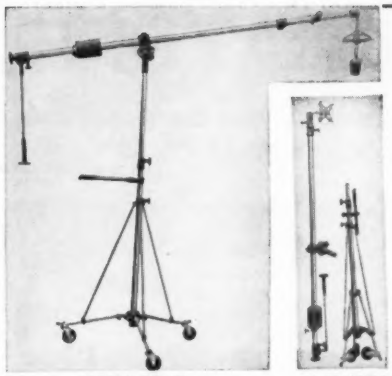
PHOTO METHODS IN USE

PORTABLE PULLMAN

Ray Jacobs, of Roslyn Heights, N. Y., solved the problem of transporting all his necessary equipment with an ordinary supermarket pushcart. (He obtained his from the Folding Carrier Corp., Oklahoma City.)

To get the cart into an automobile, he took apart the two units that are usually riveted together. By cutting the rivets and replacing with a bolt and wing nut (*arrow*), he was able to separate the basket from the wheel section for storage in the car.

Roll onward photographers!



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Polaroid Corporation Announces

QUICK, EASY WAY TO MAKE SLIDES

Now with a standard Polaroid Land Camera, you can make slides for Sales Meetings, and project them immediately.

Polaroid Corporation has perfected a film which produces black-and-white slides right in a *regular* Polaroid Land Camera. Just click the shutter and two minutes later you have a slide ready for projection.

These on-the-spot slides can help you tell a picture story to everyone—prospects, existing customers, the field selling force, management. A versatile Copymaker is available to make slides from any text, existing photographs, charts, graphs or titles. Or, if you wish, you can take the camera into the field to photograph products, displays, and other material.

Two sizes are available—2¼ x 2¼, and 3¼ x 4 for use in existing "lantern slide" projectors.

These slides cost about ⅓ as much as conventional slides. But the real saving is in the time and effort that it takes to put any picture on the screen. Send in this coupon for detailed information, plus booklet, "On Your Feet," loaded with hints for your next speech.

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FREE LITERATURE

For your copy of any free literature item, circle the appropriate number on the readers' service card, page 5[illegible].

AUDIO-VISUAL

Film in Industry **202**
Victor Animatograph Corp. 24-page booklet tells "How Industry Profits from the Use of Sound Films."

Projection Lamp Guide **203**
Westinghouse Lamp Div. 20-page reference chart is a quick reference for replacing projection lamps in motion picture, slide, microfilm, stereo and special projectors.

Table Viewer **265**
C.O.C. (Camera Optics Mfg. Corp.) offers a 4-page brochure on the Luma-Viewer, a table viewer with dual carriers for 35mm, 2¼ slides.

CAMERA & LENS

Research with Miniature **204**
Standard Camera Corp. 70-page book, *The Miniature Camera, a Major Research Tool* by Gerard O. Walter and Theodore S. Schultz, describes the applications of photography in research and engineering. Includes nomographs for determination of depth of field, proper shutter speed and the exposure of bellows extension. A section covers the Praktina camera and its accessories. Address requests to PMI, Readers' Service, 33 W. 60th St., New York, N.Y., on your letterhead.

Robot **205**
Karl Heitz, Inc. 32-page booklet, *No, Register Photographically* treats in detail the Robot sequence camera systems of photographic recording.

Sinar View Camera **234**
Karl Heitz, Inc. 24-page booklet describes the Swiss Sinar convertible view camera for film sizes 2¼ x 2¼ in square through 8 x 10.

Workhorse Cameras **239**
Beattie-Coleman, Inc. Folder contains fact sheets on a variety of precision cameras and instruments for industrial recording.

Kerr Cell Camera **206**
Electro-Optical Instruments, Inc. Catalog sheet on the KSC-10 camera comprising a Crown Graphic 45, a pulse generator and a Kerr Cell shutter for making exposures within one millimicrosecond (1/1,000,000,000 sec.)

ID Unit **207**
Fairchild Camera and Instrument Corp. 4-page folder describes the Fairchild-Polaroid ID camera, camera stand, identification unit and lighting arrangement. Includes prices.

Tele Lenses **208**
Agof-Schacht Lens Corp. Price list of Schacht-Travenar and Schacht-Travenon lenses for 35mm cameras.

Optika IIA **264**
Aetna Optix 12-page booklet outlines features of Optika IIa single lens reflex camera with four negative sizes from 2¼ x 1¾ to 2¼ x 3¼-in.

Image Converter System **263**
Librascope Inc.'s 2-page brochure describes the Model C Image Converter camera, capable of exposure times to 10 millimicroseconds, which is electrostatically focused and deflected.

Neutral Density Filters **262**
Tiffen Marketing Co.'s data sheet outlines functions, applications and special effects of neutral density filters.

EQUIPMENT

Rolor Catalog **209**
Rolor Industrial Corp. 22-page catalog of color processing equipment and accessories. Includes prices.

LogEtronics **210**
LogEtronics. 4-page folder cites a cost study comparing LogEtronic and conventional photographic printing methods.

Foot Switch Timer **211**
Kingdon Photo Accessories Co., Inc. Folder describes the Kingdon Foot Switch with a built-in audible time signalling device.

Photo-Genie **212**
Ideax Corp. Folder gives instructions for the use of the $15.95 Photo-Genie electronic enlarging exposure meter.

Autopod **213**
Jewett Manufacturing Co. 4-page folder on the Autopod, a device for mounting still and motion picture cameras to make photographs from a moving vehicle.

Agfa **214**
Agfa Inc. Price list of Agfa cameras, projectors, roll and sheet films and black-and-white papers.

Speed-Ez-El **215**
The A. J. Ganz Co. Price list of "Speed-Ez-El" regular and custom size enlarging easels now finished in matte yellow.

Datasync
Datasync Div. of Berndt-Bach, Inc. 38-page illustrated booklet on the Datasync combined electronic and photograph recording system. Make request on your letterhead: PMI, Reader Service, 33 W. 60, N.Y.C.

Durst 404 **217**
Durst, Inc. 4-page folder on the Durst 404 2¼ x 2¼ enlarger.

Sanford Tripod **218**
Davis & Sanford Co. 8-page folder on this firm's "floating action" tripods, motion picture pan heads, dollies and tripod accessories.

Proximeter **235**
Kling Photo Corp. Catalog sheet treats Proximeter close-up attachment for Baldessa cameras.

Electronic Flash **236**
Nems-Clarke Co. Price list of Megalume electronic flash units and accessories.

Glossy Drier **237**
Johnke Mfg. Co. Catalog sheet treats the "American" Model A-G electric glossy belt drier.

Enlargers **238**
J. G. Saltzman, Inc. Folder describes Caesar-Saltzman condenser and diffusion-type enlarger for precision color work.

Macbeth QuantaLog **261**
Macbeth Instrument Corp. bulletin announces the new QuantaLog, an instrument for densitometry, photometry and colorimetry.

Automatic X-ray Processor **260**
Refrema of America, Inc. imports a line of Danish automatic X-ray processing machines. A 6-page folder describes them.

Exposure Evaluation **258**
The factors that influence light measurement with photoelectric exposure

meters. A 4-page reprint from *American Cinematographer*, by Don Norwood, inventor of the Norwood Director incident light meter.

SUPPLIES

Flat **221**
The Upson Chemical Corp. 5-page bulletin describes the effects and use of Flat, a glossing and print flattening solution.

Flash Batteries **222**
National Carbon Co. Battery Engineering Bulletin No. 6 lists the Eveready Photographic Flash Batteries and offers technical information on their use in electronic flash circuits.

Photo Books **240**
The MacMillan Co. Folder reviews 11 technical photographic books offered by this publisher.

Ilford Printing Papers **241**
Ilford Inc. 6-page folder lists Ilford contact and projection photographic papers and chemicals.

Film Chemicals **219**
Ansco folder details and charts the use of chemicals for processing this company's films.

Ansco Films **220**
Ansco. Five compact exposure guides on Ansco products. In all, they cover each of the following products: Super Hypan, Anscochrome, All-Weather Pan, Super Anscochrome and 16mm Anscochrome and Super Anscochrome. Requests, accompanied by a stamped, self-addressed envelope should be sent to Customer Service Dept., Ansco, Binghamton, N.Y.

Technical Literature **257**
Camera Equipment Co., Inc., folder lists technical books and literature on planning, script writing, budgeting, production, filming, sound recording, editing, projection and selling for motion pictures and television.

GRAPHIC ARTS

Filter Chart **256**
Du Pont Photo Products filter guide chart for use with Du Pont Cronar graphic arts films shows original copy in nine colors, indicates which filter to use for reproducing each color either as black or as white. Data given for orthochromatic, panchromatic and blue-sensitive films.

Filmsort Facts **255**
The Filmsort Co. monthly discusses microfilm techniques for engineering drawings.

MOTION PICTURES

Portman Equipment **226**
Warren Conrad Portman Co. 30-page booklet covers in detail the Portman System of equipment for titling animation and special effects. Includes prices.

Filmusic **227**
Langlois Filmusic, Inc. Price list covers adding music to motion pictures for industrial, theatrical and TV use.

Prism Photography **224**
The Camera Mart Inc. Catalog sheet on the Camart Optical FX unit for producing two-to-seven images of a single subject in motion pictures. Includes prices.

Cost Estimator **223**
Consolidated Film Industries. Slide-rule type estimator automatically estimates running time, footage or cost of

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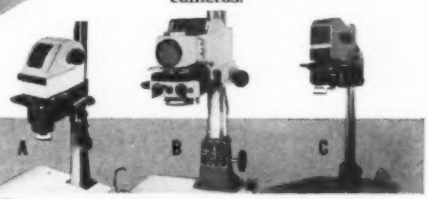

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C DURST D-659—Automatic focusing, twin lens turret, adjustable negative carrier from 35mm to 2½ x 3½".

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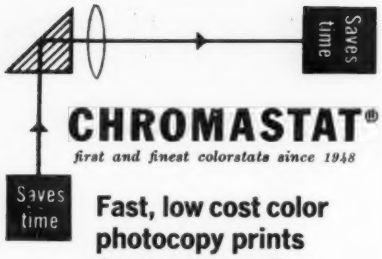

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film from any one of these three factors. It reads in 35mm or 16mm.

CFI **225**
Consolidated Film Industries. 12-page price list covers processing motion picture film in black-and-white, Kodachrome and Eastman Color.

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Rental Prices **228**
Camera Equipment Co. 10-page rental price list covers still and motion picture cameras, lighting, shooting and editing equipment.

Vidicon Camera Lenses **229**
Albion Optical Co. 14-page data sheet describes the Taylor-Hobson range of lenses for use with the Vidicon type television camera tubes.

Animation Equipment **230**
J. G. Saltzman, Inc. 6-page folder catalogs Caesar-Saltzman Animation equipment and Special Effects Optical Printers.

Lighting **231**
Mole-Richardson Co. 44-page catalog of lighting equipment. Includes tables and lighting bibliography.

TV, Film Production **247**
Morgan & Morgan Inc.'s 4-page brochure outlines contents of Ernest M. Pittaro's *TV & Film Production Data Book.*

16mm Services **248**
Film Labs, Inc. lists laboratory services, 16mm black-and-white pre-release and release printing costs in 3-page handy file-type folder.

Sync Motor Drives **254**
Lafayette Instrument Co. Catalog sheet outlines and lists prices for synchronous motor drives for Kodak Cine Special cameras.

Price List **253**
Capital Film Laboratories, Inc. lists new prices for 16mm color reversal printing, 16mm black-and-white prerelease printing and services, 16mm black-and-white release printing, sound services, editorial services, music, effects and narrators, reels and cans, and shipping.

Mood Music **252**
Thomas J. Valentino, Inc. Catalog of 15 hours of mood music background for industrial films.

Rotary Prism Camera **251**
Photo-Sonics, Inc.'s 4-page folder describes uses of 16mm-1B Rotary Prism camera for motion pictures at frame speeds up to 1000 fps.

Ediola **250**
S.O.S. Cinema Supply Corp. 4-page illustrated brochure describes the S.O.S. 16mm Action Viewer, the S.O.S. Ediola Sound Reader and Picture Editor.

Variable Shutter **248**
Pellegrini-Piek. 16-page booklet describes variable-shutter installation on Bolex H16, H8 and H16 reflexes.

Lighting **247**
J. G. McAlister, Inc. 16-page catalog of lamps, stands, light control, accessory equipment.

Editing Services **246**
Ross Gaffney, Inc. 8-page booklet outlines the editing, titling animation, music and sound services of this New York firm.

Splicer **245**
Camera Equipment Co., Inc. 6-page folder details the Ace Mylar Splicer.

Arri **243**
Camera Equipment Co., Inc. 8-page booklet describes the Arriflex 35 Model HB, its features and accessories.

SERVICES

Color Lab **232**
Avery Color Laboratories. Price list of dupe transparencies for reproduction, Ektacolor Paper color prints and color film processing.

Color Data **233**
Kurshan & Lang Color Service, Inc. 16-page booklet describes services and lists prices of this New York color service for prints, processing, duplicating, filmstrips and Flexichrome.

Rapid Colorprint **249**
Rapid Colorprint Co., Inc., Glendale, Calif. New 20-page catalog includes prices for color copying, processing, duplication and a complete price schedule for Ektacolor paper prints to 20 x 24 in.

Use this handy subscription order to receive your own copy of PMI every month.

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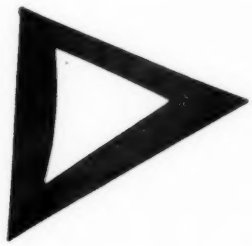

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NEW PRODUCTS

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Bausch & Lomb Projector 102

The Balomatic 305 is a 500-watt projector, shows up to forty 35mm slides with just a touch of a button to change each one. One panel contains all controls. Finish is two-tone grey with chip-proof enamel. It is UL-CSA approved and carries a lifetime guarantee. Price of the Balomatic 305 is $99.50 with one slide tray. Additional trays are $1.25 each.

Underwater Exposure Meter 103

The Wiener Precision Lab's Model UW-150, is an underwater housing containing a Weston DR photoelectric exposure meter. Front and back walls of the housing are made of ⅜-in Lucite. The body of the housing is ¼-in. Lucite tubing. The unit has O-ring seals and, according to the manufacturer, has been tested to a depth of 150 ft. Since the Weston DR is a direct reading meter no external controls on the housing are required for determining exposure. The neckstrap is nylon and body fittings are stainless steel to prevent corrosion. Price complete with meter is $39.95.

Mamiya C Accessories 104

Listed as new accessories for the Mamiya C Interchangeable Twin Lens Reflex Camera are: 180mm telephoto f/4.5 lens; cut film back which accepts single sheets of 2¼ x 3¼ cut film; tripod adapter for use on flat-bed tripod heads; everready hard leather case; camera bodies without lenses.

Tele lens price with case is $139.50. Price of cut film back with three film holders is $29.95. Tripod head costs $3.95. Everready case, plush lined with detachable front cover for 80mm and 105mm lens camera lists for $12.50; $15 for 135mm or 180mm equipped cameras. Camera body price is $80.

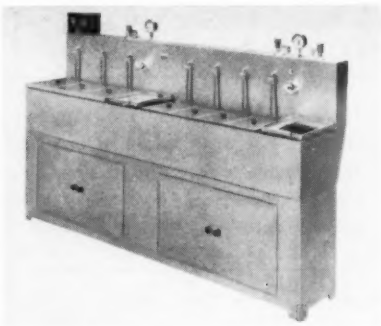
Single-Lens Reflex 105

Rittreck single-lens reflex camera offered by Le Grange, Inc. takes three different sized pictures with 120 roll film and also accepts cut film and film packs. Lenses are interchangeable by means of removable lens board; focal plane shutter has speeds from 1/20 sec. to 1/400 sec., plus B and T.

Other features are: focusing down to 13 in. with standard lens; focusing magnifier and sports finder; accepts conventional wide angle lenses; body shutter release. Price with 105mm f/3.5 lens and roll holder, $198.50. Accessory wide-angle and tele lenses available.

Calumet Color Processor 124

With seven 3½-gal solution tanks, the Calumet Color Processor is designed for handling transparency or negative color film or color prints up to 8 x 10 in. Built-in features are water jacket and wash water temperature control within a half-degree fahrenheit, nitrogen gas distributors for solution tanks, and two quick dump wash tanks. Solution tanks are equipped with leveling screws to increase the efficiency of the



nitrogen burst system. Tanks and washers take Eastman print material processing baskets. Floor space is 96 x 21½ in. CP-100 Calumet Color Processor in Type 316 stainless steel is $1,824. A Model CP-101, without cabinet base, mounted on legs is $1,475.

Universal Changer 107

The Kodak Universal Changer can be used with all three types of mounts —glass, metal or cardboard—on the Kodak 300 and 500 projectors. There's an adapter for using the changer with the Kodaslide Signet Model 2. The changer has a built-in shutter that darkens the screen between slides instead of allowing the image to move off the screen as slides are changed. The molded trays hold 36 slides in any combination of the three types of mounts. Price of the Universal changer is $11.95 and includes one tray. The Signet projector adapter sells for 50¢. A carrying carton of six trays is priced at $5.50.

Edmund Moon Camera 106

Edmund Scientific Co. offers a terrestrial camera for shooting through your telescope. The compact unit measures 3 x 4 x 5 in., has a 4-element lens and German-made shutter with speeds of T, B, 1, ½, 1/5, 1/10, 1/25, 1/100 and 1/200 sec. The camera uses sheet film in a 2¼ x 3¼ film holder included with the camera. The tube part of the camera, which slips into the eyepiece of your telescope, is 5 in. long with 1¼-in. outside diameter for standard models. Price of the camera including yellow filter, cable release and 3¼ x 4½-in. ground glass is $39.50.

Overhead Camera 126

The Robertson "830" process camera supplements the Robertson line of overhead cameras. It was designed for those whose needs are slightly less exacting or extensive than those requiring the "Tri-Color" series.

The new camera's features include: an all-cast metal copyboard; a front case and rear case structure; a bi-rail track employing center guide construction; and a wide range of attachments and accessories. The camera is available with manual or screw drive focusing.

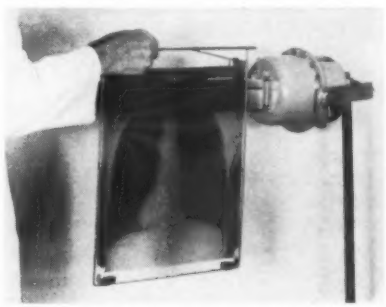
Vacuum film holder has 26 x 32-in. capacity. A spring-loaded, glass-covered copyboard accommodates 34 x 44-in. copy.

Calumet B&W Processor 125

The four compartments of the Calumet black-and-white Film Processor each handle up to eighteen 8 x 10 or nineteen 5 x 7 or smaller sheets of black-and-white film. The unit features nitrogen burst distributors in developer and fix tanks, temperature control to plus or minus ½°F for the water jacket and quick-dump wash tank, and built-in controls for water, temperature and gas. Plumbing requirements are hot and cold water supply and a drain. Floor space is 48 x 20½ in. The complete stainless steel unit is $1,150; without under-sink cabinet, but mounted on legs the unit is $895. A hanger rack is $16.

Film Dryer 116

The Vibrair film dryer utilizes evaporation, an air squeegee and vibration in removing surface moisture. Its air



tube is so designed that the air flow holds the film close to the tube even while forcing more than 80 cubic ft. per minute over the surface of the film. A cushion of air between the tube

and film prevents film scratching or damage, the manufacturer claims. Used in conjunction with the cabinet dryer for final drying and hardening, the unit is said to cut the total drying time by 80 per cent.

Focusing Magnifier 109

The Ednalite magnifier is designed for critical examination of all types of projected or translucent ground glass images. It may be used for critical focusing with any reflex or ground glass back camera and is made with coated lenses which are said to produce a sharp image even at the edges. Price is $9.75.

Photo-Genie 128

Priced at $15.95, the Photo-Genie is an enlarging exposure meter said to be capable of measuring the effective printing density of any part of a negative—from highlight to shadow area. Furthermore, with a little experimentation with your printing papers, the manufacturer states it is possible to predict the correct print paper grade for any negative. In normal use, you make the best print you can from a favorite shot. When you've established lens opening and exposure time, you "balance" the Photo-

Genie for, say, the darkest shadow in which you want detail. Following this you determine lens opening for any negative by placing the instrument under a shadow area and closing the enlarger lens until a signal light on the Photo-Genie just turns on. Exposure time remains constant. The unit reads an area of about 1/16 x ⅛-in. Takes AC house current.

Tele Lenses 110

Two new high-resolution telephoto lenses for the Praktina FX camera are now offered by Standard Camera Corp. The 135mm f/2.8 Steinheil Quinar is said to be a high-speed, high-resolution, true telephoto lens. It contains five elements, anti-reflection coated on all lens-to-air surfaces. The angle of view is 15.2°. Image magnification, as compared to that provided by the normal focal length 50mm f/2.8 Tessar lens for the Praktina FX camera, is 2.7X.

The 200mm f/4.5 Steinheil Quinar lens features 5-element design and a

10.3° angle of view. It also is said to be a true telephoto. Both lenses are supplied with front and rear lens caps, lens shades and leather carrying cases with carrying straps. List price of either lens is $149.50. Both lenses, at the same list price, are available in screw-in mounts for Praktica FX2 and FX3 cameras, as well as any others with similar mounts.

For additional information on any new products item, circle the appropriate number on the readers' service card attached to page 59

Multi-Purpose Developer 114

A new film developer concentrate which can be diluted in several different types of developers is the FG7 concentrate announced by Edwal Scientific Products Corp. It is not a single developer which is to be used for all types of film, but it produces different developers with entirely different characteristics when diluted and used in the various ways recommended.

At 1:1 dilution, Edwal FG7 is said to develop fairly fine grain in four minutes, suitable for newspapers and others who need processing speed. At 1:3 dilution it gives normal speed and fine grain at 6 minutes developing time and can be pushed by prolonging the time (it gives ASA 1000 on Tri-X at 10 to 12 minutes, or ASA 2000 at 20 to 25 minutes at 70° F.). At 1:7 dilution, it is a good one-shot developer for Royal-X, and at 1:15 dilution, it becomes a compensating type, high-resolution developer for the thin emulsion films. Another method of use in the dilution of FG7 Concentrate with 15 parts of a sulphite solution (directions are given) which gives a one-shot fine grain developer for the medium and high-speed films. Edwal FG7 is available in 16-oz. bottles a 99¢, quart bottles at $1.75 and gallon bottles at $6.75.

Explorer Projectors 112

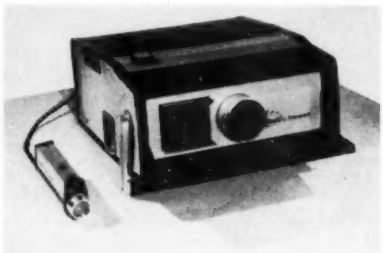
Four new models are included in the line of automatic slide projectors called the Explorer series, from Bell & Howell.

Features in the new line include: an exclusive "bubble" design in the Micro-Mount slide holder which mechanically prevents slide from going out of focus even if held on the screen for extremely long periods; completely automatic reverse as well as advance of slides from the hand-held remote control unit as standard equipment on three models; Filmovara zoom lens which adjusts the size of the picture to the screen without moving the projector. The zoom lens is standard equipment on one model, optional on the other three; illuminated pointer built into the remote control unit operates at the push of a button, focuses to the size desired.

The Explorer projectors feature a carrying bar that swings under the machine to become the front tilt support. All models have a built-in slide "editor" permitting slides to be re-arranged even during slide show while tray is in the projector. Functional styling in the projector series permits hot air exhaust to be expelled at the side of the machine away from the projectionist. With the new Micro-Mount system slides cannot spill out of tray, are dust-proof and sealed against damage to the basic cardboard mount.

Deluxe model projectors automatically move slide tray to first slide in the tray, passing up empty slide compartments in both forward and reverse.

No light is thrown on the screen as



slide moves forward or backward in the new projectors until a slide moves into position for showing.

Models in two-tone fawn and brown feature 300-watt illumination at prices of $79.95 and $99.95. Latter model has Bell & Howell "Point-A-Ray" remote control unit.

Deluxe 500-watt models in black Morocco-grained vinyl and polished aluminum have built-in timer cycling from 8 sec. to a full minute. The remote control automatically overrides and restores timing cycle at any point during slide showing. These units sell for $149.95 and $179.95 with the Filmovara zoom lens on the higher priced projector. The Filmovara lens

also fits the other three projector models at $30 additional.

K & E Price Reductions **101**

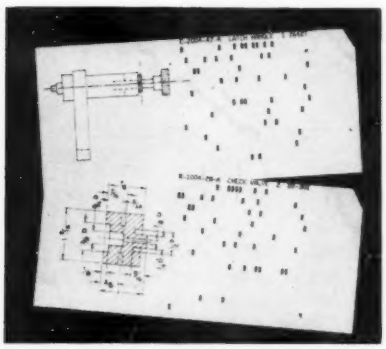
An average 12 per cent price reduction for K & E Herculene Drafting Film bringing its cost below current prices for tracing cloth, has been announced by Keuffel & Esser Co.

Herculene 163 in 36-in. rolls has been reduced to $36 from its old list price of $41.40. Herculene 163ET in 36-in. rolls has been reduced to $28 from its old list price of $31.50.

Made on Du Pont Mylar base, qualities cited for Herculene are: high tear strength, translucency, flexibility and dimensional stability.

Sensitized Tab Cards **111**

Sensitized standard size, 3¼ x 7⅜-in., tabulating cards for combining pictorial material with coded and punched data have been introduced by Ozalid Division, General Aniline and Film Corp.



These diazo coated cards may be employed in production control systems, pictorial language presentations, inventory procedures, personnel records or wherever visual items need to be used in a tabulating card system.

Microfilm Processor **123**

Unipro (universal processor) a self-contained unit which processes and dries microfilm at the rate of 100 feet of film in 30 minutes, has been announced by Remington Rand Division of Sperry Rand Corp. Unipro will process 16, 35 or 70mm film continuously or interchangeably without adjustment and without special attachments. The machine is made for daylight loading and operation. Audible signals indicate when the end of a roll has been reached and controls automatically govern the temperature of two solutions used in processing. Unipro will develop dye back, non-dye back or positive film to meet the requirements of the National Bureau of Standards for archival permanence. When properly stored it is said the film will remain usable for 300 to 500 years. Price: $1,895 f.o.b. Philadelphia.

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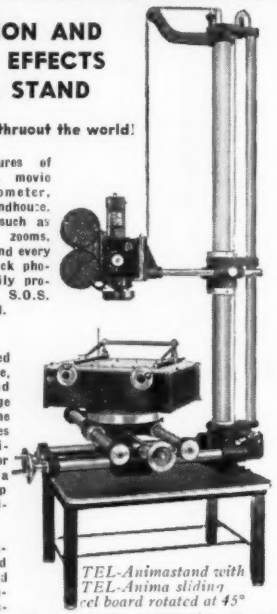

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SHORT RUN REPRODUCTION

(continued from page 31)

unit. Upon separation a thin layer of gelatin and dye remains attached to the offset plate to form an ink receptive image. Following a simple image conditioning treatment the offset master is ready for the press. Verifax offset masters are made in less than three minutes for about 20¢ each and are reported capable of producing up to 1000 offset copies.

A minimum of equipment is required. A complete outfit for producing offset masters comprising a combination exposure and processing unit, plus the registering offset adapter, is available for a low as $210.

The same equipment can be utilized for other end results. By using ordinary bond paper as the image carrier up to five positive copies can be obtained from a matrix. Transferring to a translucent material results in a positive intermediate for use as a diazo master, for exposing photo-chemical mimeo stencils, and other applications.

DTR PHOTOCOPY

From original to offset master in a minute or less is the speed possible with the DTR system. Based on the diffusion-transfer-reversal principle (one-step photography), a positive image is created on a receiving sheet while in contact with a negative emulsion during development. Special negative and positive materials are required as well as processing solutions and equipment. In addition to the aluminum offset master, the positive image may be generated on a number of other supports—paper, card stock, and film.

In making an offset master, a special negative paper is first exposed in the usual reflex manner. The exposed negative and the metal offset plate are placed face-to-face and inserted in the developing machine. The two pass through the developing solution separately, but in unison, and then enter a set of rollers where they are squeegeed together and ejected from the machine. While in contact a direct-reading positive image is being developed on the offset plate. After about fifteen seconds of contact the sandwich may be separated. After a minor treatment to strengthen the image, the plate is ready to put on the press. The paper negative is of no further use in the process but may be retained for making contact prints, or exposing conventional offset plates.

Compact, combination exposure and processing machines are available starting at about $110. Material cost of the completed offset master is as low as 40¢.

DTR supplies and equipment are available from a dozen or more suppliers under as many different brand names. At publication time the DTR offset plate was known to be available only from the A. B. Dick Company and the distributors or licensees of Gevacopy (Gevaert Company of America, Inc.).

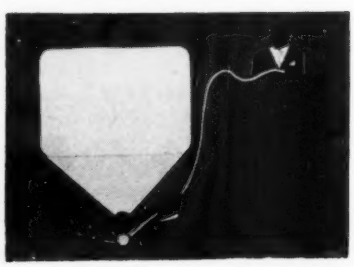
CONCLUSION

With the exception of conventional process photography, the methods cited not only produce duplicator masters by simple and inexpensive means but serve to take care of the occasional copying job as well. In each case, two or more distinct and separate functions can be performed. While none of the systems outlined can be considered a universal answer to the duplicating problem, at least one of the combinations suggested will satisfy most in-plant duplicating requirements.—THE END

PHOTO METHODS IN USE

NEXT SLIDE PLEASE!

One answer to the speaker's problem of how to signal the projectionist for the next slide is to make a signal light that can be silently flashed by remote control. You can use your flashgun installed with a test light and plug in a remote tripper cord. Or, you might convert a dime store penlite into the signal light by wiring it to a flashgun remote tripper cord.



PETER A. CAREY
Bendix Aviation

DRAFTING

(Continued from page 27)

the silver image. For those who may want to make their own eradicator, the following formula is recommended by our Photo Products Dept.:

Solution A

water	16 oz.
cupric chloride (blue crystals)	6 oz.
sodium chloride (pure)	4 oz.
hydrochloric acid (conc.)	¾ dram
water to make	32 oz.

Solution B

water about 125°	16 oz.
sodium sulfite, desiccated	1 oz.
sodium bisulfite	1 oz.
sodium thiosulfate (hypo)	8 oz.
water to make	32 oz.

Dissolve chemicals in order given.
Directions for use

"Apply solution 'A' with a dropper, glass rod or small brush to cover desired area. As soon as the line or figure is bleached, blot off the area and apply solution 'B,' being careful to completely cover the area wet by solution 'A.' As soon as the stain has been removed, again blot off the area. Finally, swab the area with clean water to remove traces of solution 'B.' Repeated use of the same swab will cause contamination.

Warning

"Eradicator should be used only on well-washed prints. If permanence is important, prints should be rewashed after treatment with eradicator.

"The one major difficulty as yet unsolved is that of reducing foreshortening. Our engineers would like an orthagonal rendering. It is possible, of course, to minimize foreshortening by using extremely long focal length lenses, say 75 ft., and setting the camera a fifth of a mile or so away so that the lines appear to be parallel.

"We photograph the model from a distance of 40 ft. using a 35-in. process lens in a view camera with extension backs for 4 x 5 and 8 x 10 film holders. The final prints are made on 'Cronaflex' Projection Film —using a conventional enlarger and exposing through a contact half-tone screen. Development is done by inspection in litho type developer. We feel that optimum results are obtained using a 100-line screen; especially if prints are to be made by the diazo process. Prints made using a 120-line screen are also quite acceptable. By diluting a standard paper developer 1:10 we can get a continuous-tone image on the projection film which will reproduce on diazo or blueprint, but not as well as the halftone image.

"After the photo-tracing is completed it is turned over to the designer who adds the dimensions, notes, piping symbols and other pertinent data. Prints for issue to construction are normally produced by diazo equipment in order to show the model in 'positive' form, but blueprints have also proven quite acceptable and, in fact, usualy show fine detail better than diazo prints.

"We do not intend to convey the impression that all drafting can be eliminated. It is still necessary to apply all lettering and dimensions manually. As in the case of conventional drafting it is still necessary to detail certain areas separately.

"Another application of photography as a tool in design work is an outgrowth of the use of model photography. We refer to this as plant modification photography. This consists of taking photographs of equipment, piping or areas of an existing building where alterations or additional work is to be performed. These photographs are then reproduced on 'Cronaflex' projection film. Modifications are made by the addition of drafting work directly on these Cronaflex prints, which are then used as intermediates for the reproductions, issued for construction.

"We're beginning to believe that we can now make a highly useful engineering drawing of anything that can be clearly photographed."

—THE END

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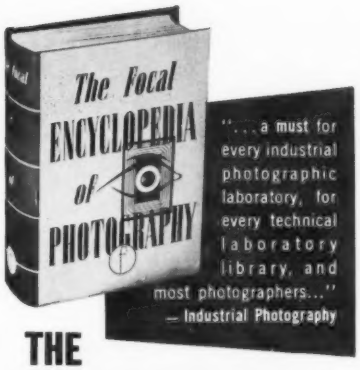
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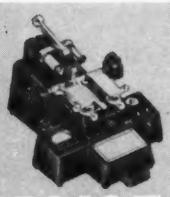

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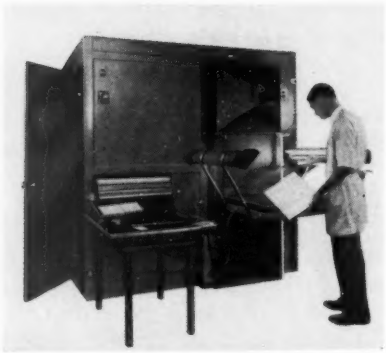

IN-PLANT TEST

Repro Supervisor at Metropolitan Life says Statmaster camera-plus-darkroom unit pays off in quality work and efficiency

SPECIFICATIONS: Manufactured by the Statmaster Corp., 19 W. 44th St., New York 36, N. Y. Available in three models, the Statmaster is a self-enclosed copy camera and darkroom complete with lens, prism, fluorescent tube copy lights and trans-illuminator, stainless-steel sink, enameled trays, paper safe, built-in wiring and outlets and an exhaust fan. The unit may be installed in any room, draws house current. The Model 1 is 4 x 4 x 7 ft.; enlarges 250 per cent, reduces 350 per cent; has a 14-in. Goerz Red Dot Artar Apochromat matched lens and prism; offers a 14 x 17 sensitized-material capacity (18 x 24 with attachment). The Model 2 is 4 x 6 x 7 ft.; enlarges 350 per cent, reduces 350 per cent; in other respects is like Model 1, except has automatic electronic timer. The Model 3 (pictured above) is 6 x 6 x 8 ft.; enlarges 500 per cent, reduces 250 per cent; has 19-in. Goerz Apochromat; has 18 x 24 sensitized material capacity (20 x 30 with adapter); includes automatic electronic timer. Units are marketed by outright sale or leased.

Louis J. Leonardi, Supervisor, Photo Bureau, Metropolitan Life Insurance Co., New York, N.Y. reports: In a search for equipment that, in effect, would be a hybrid between photography and photocopy, Statmaster captured both our interest and our imagination.

Basically we needed a machine that would produce line work sharply and clearly on a variety of printing stocks. The operating cost had to be substantially lower than regular photography since, in addition to a battery of photocopy machines, our existing installation included a wide range of cameras and several completely equipped darkrooms. In short, anything we might buy had to sell itself solidly from viewpoints of efficiency and economy.

Statmaster measured up to these basic requirements. But its strongest appeal turned out to be its versatility and the prospect of using it for types of work not in our original plan. Today there might be considerable conjecture as to where we place our strongest value in the machine—in its production of excellent copies of line work or in the dozen other types of work that we use it for.

For example, our company makes broad use of projectors and slides in conferences, sales meetings, educational projects, etc. Formerly, we made these slides on glass photographic plates, using our regular camera equipment. Of course this meant making one slide at a time. Special equipment, such as plate holders, was necessary, and exposure to spoilage due to scratches and other "bugs" was high.

Using the Statmaster, today we are making as many as six slides at a time by copying that many originals at once onto Kodalith trans-

parency stock, trimming to slide size, then sandwiching the film between pieces of glass. The edges are taped to hold the image in place.

As a copying camera with practically flick-of-the-wrist ease in enlarging or reducing, Statmaster doubtlessly would suggest itself to any technician as a regular photographic enlarger. Significantly, the machine is in constant operation and it is always set up for such type of work. We have used it, with gratifying success, in preparing enlargements of photographs to be used, for example, to make halftones for periodicals.

Among other useful applications in connection with publications work, the high-grade glossy prints of Statmaster have proved valuable in preparing strip-in material to be used by our art department in preparing photo-offset copy. Negatives furnish reverse-plate copy that once would have required an expensive line cut. Other printing-business uses have included photocopies of cartoons, trade marks and graphs used in one publication for easy transposition to another.

In such work, the enlarging-reducing possibilities of Statmaster have proved invaluable in reproducing such subjects to adapt them to other publications of varying type widths and page sizes.

In calculating the economies effected by the use of the Statmaster, too much stress cannot be placed on the factor mentioned earlier—that the machine is in constant use. This keeps it on instant call to be switched to almost any type of job, without the elaborate preparation encountered, say, in readying a few odd enlargement jobs. It seems hardly necessary to point out that the elimination of film negatives leads to considerable savings for our company.

At this point, perhaps, it would be in order to point out the few difficulties we have encountered with our Statmaster. Basically, the "faults" have been mechanical and readily correctible by the manufacturer.

Enlarging and reducing with the Statmaster involves raising and lowering the copy board on fixed rails, and compensating weights are installed to facilitate ease of adjustment. We have found, however, that through wear over three year's time the spring-loaded gripper used to hold the board at the selected height was not strong enough to prevent movement up or down when working with the same enlargement ratio for extended periods. We have solved this problem by adding a pound or two of weight to the copy board so that it balances the counterweight perfectly.

Perhaps the only other fault encountered with our Statmaster is that the trans-illuminated light box is not centered top-to-bottom on the copy board. Thus, a small amount of guesswork becomes necessary in lining up the sensitized film or paper with transparent subjects. We understand that this has been corrected on current models.

The adapter back, however, has advantages which more than compensate for this minor shortcoming. Once the operator has set up the copy on the copy board and steps inside the machine, he can flick a switch and see before him the entire image that will be reproduced, sharply and clearly. It is, for all the world, like working inside a camera and being favored with an all-important view of the picture you are going to take *before you make the exposure.*

What better vantage point could any cameraman ask?" —THE END

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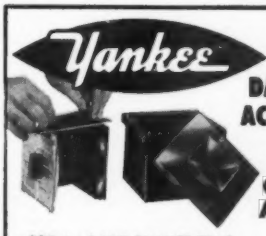

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Rate for all classifications is 30¢ per word, minimum order $4.00; except Position Wanted which is 15¢ per word. Display ad rate: $24.00 per inch. Payment must accompany order. 10% discount for ads in three consecutive issues, if entire bill is paid in advance. Count each word, including each word in address. A PMI box number counts as 5 words. Only Agate type is used. First word set in caps at no extra charge. Additional words in caps—10¢ per word extra.

Copy must be received before the 10th of the month preceding desired issue (example: Jan. 10th for Feb. issue which is mailed early in Feb.) Please print or type copy.

SERVICES

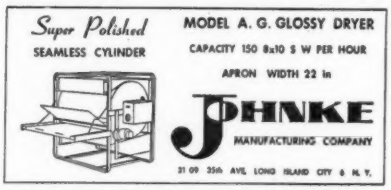
Sound-In-Sync Recording. $15 per hour. Modern 1200 sq. ft. sound stage. Rolab Studios, Sandy Hook, Conn. Garden 6-2466 (near N. Y. C.).

LOW COST COLOR PRINTS
Top Quality Fast Service
from 35mm to 4x5 Transparencies or Color Negatives, Type C; also 8mm-16mm-35mm Motion Films.
Write for samples and price list on all sizes and quantities.
George C. Schaub Color Lab
103 Sperry Blvd., New Hyde Park, N. Y.

FOR SALE

Johnke "Jomaco" Power Printer, 11" x 14". Automatic exposure, built-in timer. Continuous or footswitch operation. Roll bar platen. Twelve printing and dodging lights. 4 way adjustable masks. Excellent condition. 115V. List value $1200. Our price only $449.00 crated and delivered anywhere in the U.S.A. Brand new Pako Print Machine. Original packing. $1700.00 value. Only $1075.00. New Pakojet Washer, $1500.00 value, only $875.00. 9-3/8" x 200' rolls of enlarging paper. Ideal for proofing, single weight, semi-matte, Resisto, contrasts 1 & 2. $4.95 per roll. Hollywood Camera Co., 10611 Chandler Blvd., No. Hollywood, California.

Get more information. Circle 412, page 59


Super Polished
SEAMLESS CYLINDER
MODEL A. G. GLOSSY DRYER
CAPACITY 150 8x10 S W PER HOUR
APRON WIDTH 22 in
JOHNKE
MANUFACTURING COMPANY
31 09 35th AVE. LONG ISLAND CITY 6, N. Y.
Get more information. Circle 425, page 59

STATIKIL®
TRADEMARK REG. IN U. S. PAT. OFF.
STOPS STATIC ELECTRICITY ON DRYERS
ENDS SPOTTING ON PRINTS
$3 per can • $30 per doz.
STATIKIL, INC.
1220 WEST 6th ST., CLEVELAND 13, OHIO
Get more information. Circle 414, page 59

Gives a man room...that's **GEVAERT!**

Every photographer in the business can use all the elbowroom he can get! That's why we build such generous latitude into Gevaert films – to raise production, boost over-all work quality–yet still trim costs!

Gevaert papers mean quality. Their super-bright whiteness... long tone scale... and man-sized working latitude turn any run-of-the-mill print into a picture of quality.

Gevaert films, papers and plates are famed for quality the world over.

If there's room for quality in your picture – use GEVAERT!

GEVAERT FILMS–GEVAPAN 36–ASA D250, T160 –very fast, but easily controlled. Holds every detail, retouches easily. Subtle or definitive in scale, depending on developer used.

GEVAPAN 33 – ASA D125, T80 – with new improvement in abrasion resistance. For speed and contrast, for good balance with regular or electronic flash.

GEVAPAN 30–ASA D64, T40–can be used at large lens openings for strobe and high-speed work. Fine quality, beautifully balanced for portraits.

GEVAERT PAPERS – ORTHOBROM – the all-purpose bromide enlarging paper with new brightness added for clearer, more sparkling prints. Complete tonal range. Five grades, many surfaces, in exceptionally wide rolls (up to 51") for mural work.

GEVARTO – a moderately warm projection paper that resists abuse. Wide latitude. In three grades and many surfaces.

PROJECTION PROOF – warm in tone, with a rough surface that minimizes retouching. Gives exceptional richness to murals and proofs. In sheets and rolls to 48" wide.

GEVAERT THE GEVAERT COMPANY OF AMERICA, INC.

SALES OFFICES AND WAREHOUSES AT
321 West 54th Street, New York 19, N. Y.
6601 N. Lincoln Ave., Lincolnwood, Ill. (Chicago)
6370 Santa Monica Blvd., Los Angeles 38, Calif.
9109 Sovereign Row, Dallas, Texas
P.O. Box 9161, Denver, Colo.
In Canada: Gevaert (Canada) Limited
345 Adelaide St., West, Toronto 2-B, Ontario

Get more information. Circle 416, page 59

win more screen credits with Kodak professional equipment

When you add to the effectiveness of your motion pictures, every screening becomes a highly visible credit to you and your department.

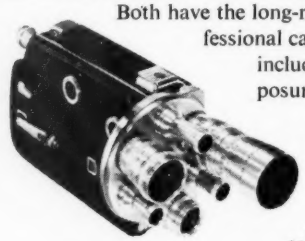
Add the effectiveness of magnetic sound—with the Kodak Pageant Sound Projector, Magnetic-Optical. Start by simply adding a magnetic stripe to old or new films. You can add sound as you screen the film with your Pageant. Erase it, change it at will, to tailor the one film to any audience or situation.

Same picture, different sound—and it becomes a how-to indoctrination picture—a sales presentation—or a review of what you make for a stockholders' meeting.

Add the effectiveness of versatility. The same Pageant Projector is also a fine optical sound projector. Ten watts, high-fidelity output with either magnetic or optical sound. Big, brilliant screen picture—750- or 1000-watt lamp.

Add effective economy. A single Pageant Projector takes professional care of all your 16mm projection needs—silent, optical-sound, magnetic-sound. It is also a precision magnetic recorder for adding sound to film. Add to this the fact that it never, never needs oiling and you have another reason why it is such a sound investment at $850.*

Add the taking effectiveness of the Cine-Kodak K-100 Camera and you will have a matched movie team. The K-100 and the K-100 Turret Cameras are both precision movie-makers, combining the ease of home movie-making with true professional standards. Both have the long-running motors of professional cameras, variable speeds including single-frame exposure for animations, interchangeable lenses —and prices start at $299.*



Ask your Kodak Dealer for a demonstration, or write for complete information.

**List prices, subject to change without notice.*

EASTMAN KODAK COMPANY, Dept. 8-V, Rochester 4, N. Y.

Kodak
TRADE MARK